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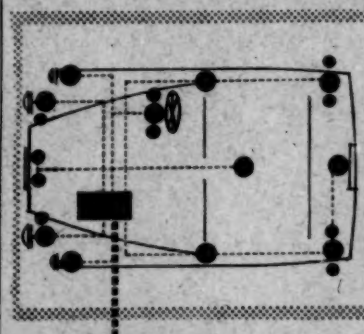

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY DECEMBER 24 1955

PROMETHEUS AND TO-MORROW*

BY

ERIC LINKLATER

One of the several disabilities of contemporary life is the endless assault upon our minds of scientific discovery and the glittering inventions of applied science. At one moment we are staggered by the astronomer's revelation of galaxies beyond the galaxies that were charted yesterday; and scarcely have we accepted a new breach in the frontiers of the sky when we are summoned to applaud a new invasion of the bacteriologist's fearful kingdom by yet another successfully isolated antibiotic. The physicist, having profoundly alarmed us by a demonstration of nuclear fission, throws us into deeper consternation by the more dreadful menace of fusion; and the psychologist, after shocking us by an exposure of the sexual snake-pit that underlies our conscious minds, throws us into profounder gloom with his assurance that every human brain is still haunted by the ritual obligations of the Stone Age. In the material and visible world we see aircraft flying at supersonic speeds, and, desperately trying to keep abreast of them, we study aerodynamics, metallurgy, and jet-propulsion; while nightly, before an illuminated screen and entertainment that used (unfairly) to be confined to the nursery, we are stimulated to think of the laws that govern the emission of electrons from a surface irradiated by light, and of the quantum theory of Planck that encouraged them to do so.

Amid all this new knowledge—of which my examples are but small fragments—a great deal of old knowledge has been lost. Two or three generations ago an educated person knew nothing of aerodynamics, nothing of Freud or fission, but, among other acquaintances, he would know something of the gods and goddesses who, in a classical imagination, once lived on Mount Olympus; and such knowledge had been common among educated people since the renascence of learning. To-day, however, it has vanished, and you may think it no great loss. The gods of ancient Greece were indeed often as wanton and irresponsible as the admissions of a patient on the psychiatrist's sofa, and their behaviour was no example for the industrious, obedient, and orderly inhabitants of a welfare state. But the mythology in which they lived is not without interest, and in this century of the world there is one of its larger figures—a giant in the shadow behind Olympus—who in particular deserves attention.

Prometheus's Gift to Man

His name is Prometheus, and Prometheus was the friend of mortals. When Zeus, King of the Universe, was in a mind to destroy all human beings, Prometheus persuaded him to be merciful, and when Zeus refused to let men have fire, Prometheus stole fire from Olympus and gave it to mankind. For this he was punished: Zeus had him chained to a pillar in the Caucasus, where all day long a vulture tore at his liver, and his punishment was eternal, because at night his liver grew whole again, and the vulture returned with the morning.

He had stolen fire, and fire was the precursor of all human arts and crafts. Without fire, man would have remained a beast of the field and the forest; but with fire he acquired power as well as comfort, he learnt to be a goldsmith and a cook, he bent iron to his will and distilled strong waters from the grain he cut. He grew in stature, and not only challenged the wisdom of the gods but disputed their existence: all because of fire. Little wonder that Zeus was angry with Prometheus! And because, in the first few centuries after the domestication of fire, it often broke out of control and consumed whole forests in a scarlet fury of destruction, men felt guilty in their possession of such a power—and, transferring their guilt to Prometheus, who had bestowed it on them, imagined him as suffering perpetual torment.

We, in a new Promethean era, suffer in much the same way. We are not so simple, nowadays, as to believe in heavenly vultures with a taste for liver, but we never doubt the iron beak of *Angst*, or anxiety, and remorse of conscience that will return with the morning. Because we too, by the Promethean agency of the physicists, have taken power from nature, and nuclear fission has already consumed great hordes of people in Hiroshima and Nagasaki, as the forest fires of primitive times consumed the villages in their clearings and the deer and the birds that sheltered in their glades. So we, who are about to enjoy the increasing power and comfort of our Promethean age, enter our inheritance with a knowledge of guilt, a sensation of fear, just as the successors to the first fire-raisers crossed the threshold of their heritage.

We should realize that they had good cause for dread; because fire in untaught hands can easily consume those hands, and all their neighbours. Very often, in the primitive ages of man, fire must have taken fearful toll of the innocents who warmed themselves beside it; and a primeval forest ablaze by night was no less terrifying to those who had escaped its heat, and stood to watch, than to us would be the blinding flash, the mushroom of smoke, and the burning city set alight by nuclear explosion. But our primitive forefathers survived their peril, and learnt gradually to keep fire under discipline.

*Inaugural address to the Leeds School of Medicine at the opening of the academic year, delivered on October 13.

Fire, though still rebellious from time to time, became their invaluable and faithful servant, and nowadays we, in the civilized limitation of our lives, must stretch imagination to visualize men who could live without it. So, some two or three thousand years hence, may our successors on earth laugh and wonder how we existed in any tolerable comfort without nuclear energy to warm and move us and drive the great engines of our commerce.

To reinforce a little this optimistic view—it is easier, of course, to be optimistic at long range—let me remind you of another chapter in the Promethean myth.

Hope, The Immortal

Prometheus had a brother, Epimetheus, who was the fool of the family—the fool has a more ancient lineage than any aristocrat—and Epimetheus married a young woman called Pandora, whom Zeus had fashioned expressly for his torment. She was beautiful beyond all other women, but lazy, mischievous, and silly. (The type is not unknown to-day, and, whatever one may think of Zeus, one must respect him for forging a genetic strain that, through the ages, has so well kept its heritable characteristics.) In Epimetheus's home Pandora found a box that Prometheus had given him, with a warning not to open it; but Pandora unlocked it, and out flew all the ills and curses of humanity that Prometheus had imprisoned: vices and passions, disease and old age, madness and the curse of daily work, out they came, and so vexed and bewildered men and women that they were tempted to a general suicide. From this untimely end, however, they were dissuaded by Hope, which also had escaped the box, where Prometheus had shut her up because Hope, as he well knew, was often delusive and a liar. But humankind was preserved by Hope, and Hope has lost neither her charm nor her youthful energy. Hope has long outlived Fear; for every age has had its peculiar fear, and that fear lasts no longer than its age. But Hope appears to be immortal, and is ever capable of inspiring new, fantastic enterprise and strange experiment. To-day, against all the odds, we hope and labour to make an end of war; there are those who hope also to make an end of the old reproach of "crying for the moon" by reaching out to it and fetching geological samples home again.

That this expectation will shortly be realized is, I understand, the confident belief of everyone in this country and the United States of America under the age of 12; and so large a faith may in time be substantiated. I myself have little interest in the moon except as a luminary. In my youth it often gave comfort and courage that daylight failed to instil, and now I take pleasure in its bright passage between the clouds, or in its seeming capture by the branches of a birch tree. But I have no desire to visit it. I should, however, dearly like to see the effect on my fellow-men of a successful voyage to the moon, and the safe return of the voyagers.

Should this happen within the lifetime of our present Monarch, then indeed there will be a new Elizabethan age to out-splendour Drake and Frobisher, Hawkins and Raleigh, Cavendish and the other great voyagers; and, as in the sixteenth century, the spirit of man will soar like an eagle to survey its new dominions with swelling pride and a recaptured assurance of illimitable power.

It would be an exhilarating age in which to live, and its exhilaration might, for a little while, ease and mollify some of the perpetual pains and difficulties that descended on man when Pandora so foolishly opened her box. But it would not, of course, abolish pain and difficulty, nor solve the ultimate problems of life. Human nature would not change, though under the pressure of increased excitement the suicide rate might fall, and more people of my age die of a coronary thrombosis. But human nature contains more than its sensibilities, more than a susceptibility to disease. It includes the obligations of the human condition.

Go to a slaughterhouse and watch the butchering of a sheep: what will first of all strike you is the extraordinary resemblance between its inner parts and those of man. Its organs are functionally the same, and the same organs exist in both anatomies. It may be that from your reading of history and observation of your neighbours you have detected other than purely physical resemblances—but a moment's reflection will assure you that the differences are even greater. Man, for example, has the privilege of laughter, and acknowledges a compulsion to work. It may be that we learnt to laugh when we first realized how much of our work was useless, and how much would be wasted; but, notwithstanding that possibility, the necessity of work remains. It was one of the primary ills that Pandora let out of her box. It was commanded by the God of Israel, who declared, "In the sweat of thy face shalt thou eat bread." Karl Marx advised the workers of the world to unite, but, in view of the increased union dues that would be exacted, promised no respite from work. And every succeeding Chancellor of the Exchequer warns us that to maintain our standard of living we must work harder than ever.

Satisfaction of a Medical Career

With all that authority behind it, one must, I fear, accept the fact that work is inseparable from our condition—and, this being so, you who have entered the profession of medicine deserve, I think, to be congratulated on your choice. You will, in the first place, have many superficial advantages. You will, unlike most professional men, be able—if you wish—to talk shop without boring your audience. For your audience will inevitably consist of persons who are subject to every ailment from arteriosclerosis to a sensation of fullness after food—who already suffer, it is probable, from psychological traumata and a cold in the head—and any reference to these, or to the organs and accidents from which they emanate, will be of interest to them.

You will, whether you practise medicine or teach it, enjoy a position of some authority, and a position of authority is a most useful—perhaps the most useful—safeguard against the anonymity, the feeling of being inconspicuous and undifferenced, from which so many suffer in industrial society. And, again unlike the majority of workers in what is agreeably called civilization, you will, in many cases, have the gratification of seeing the success and conclusion of your work—unless, of course, you specialize in dermatology; but dermatology has its own rewards.

On a deeper level, you will have the permanent satisfaction of reading, simultaneously, a detective story that abounds in clues and has no end, and a poem, occasionally sublime, whose strength and tenderness, pathos and beauty, do not exclude some rough humour. You will for ever be asking yourselves, "What is the matter?"—considering clues, searching for new evidence, tentatively fitting a diagnosis—and before you have solved the mystery a new question will obtrude, teasing your minds afresh. I assume, of course, that you intend to be honest practitioners, not the sort of young doctor of whom it has been said (I believe I said it myself) that if his patient doesn't promptly respond to an injection of penicillin he sends him to consult a psychiatrist. Let us leave that kind of doctor to fiction, in the knowledge that fiction performs a useful service, and return to reality.

The Light of Sublimity

The patient who is a living detective-story may also be, I suggested, a poem of many parts that can, from time to time, reflect the light of sublimity. This you may find hard to credit when you examine some shrivelled little man with hammer-toes and a smoker's cough; but even he, even the most drably insignificant of your patients, will have had some experience of the wonder and mystery in which we live, and confidently he can expect more. He was born, and he will die; and no one who has seen birth and death

can deny that "fearfully and wonderfully are we made," or dispute the mystery that envelops us and, at the end, gives to the meanest a moment of dignity.

Between birth and death, moreover, even your little man with the smoker's cough may have shown humour in adversity, charity, magnanimity; and should you be required to make a post-mortem examination of his organs, you will certainly, if you examine them with sufficient understanding, feel something of the mood in which Rudyard Kipling wrote the poem called *McAndrew's Hymn*. There, you remember, the old fleet engineer looks down at the smoothly running engines that have carried his ship across half the world, and in the steady beat and hum of their working parts he hears an "orchestra sublime" and is moved to proper reverence:

> "True beat, full power, the clangin' chorus goes
> Clear to the tunnel where they sit, my purrin' dynamoes.
> Interdependence absolute, foreseen, ordained, decreed,
> To work, Ye'll note, at ony tilt an' every rate of speed.
> Fra' skylight-lift to furnace-bars, backed, bolted, braced and stayed,
> And singin' like the Mornin' Stars for joy that they are made;
> While, out o' touch o' vanity, the sweatin' thrust-block says:
> 'Not unto us the praise, or man—not unto us the praise.'"

Now if a man's mind can be so moved by a steam-engine it must surely respond with some emotion to contemplation of—shall we say?—the convoluted tubules of a kidney, the rhythmical capsule of the spleen, or the infinite benignity of a gall-bladder. Here are mechanisms far more delicate, exact, and perdurable than any steam-engine, and equally designed to work "at ony tilt an' every rate of speed." But the greatest, the wildest poetry is seen, not in the post-mortem room, but in the labour ward; for that emerging head may contain murder or genius—it may be another Einstein or Noël Coward—it may be a dutiful and submissive housewife or Rita Hayworth. And those small and crumpled hands, so nervously feeling the strangeness of the air, though in all probability they will never do anything more imaginative than fill up a coupon for a football pool, may write another *Divine Comedy*, another Fifth Symphony, or tease the conservative with the brush of a new Picasso.

The inauguration of the embryo is, in all cases, approximately the same; its intrauterine development follows lines now long established; but its future, within the frontier of mortality, is unpredictable because in every viable birth there is an element of the mystery by which we are encompassed, and which, in tireless repetition, is expressed, but never explained, in a human quality that can neither be measured nor fully analysed, weighed nor dissected, adequately charted nor wholly defined: and that is personality.

An Altered Pattern

Here, I suppose, is the chief reward and prime difficulty of your profession: its practice is scientific (at least, one hopes so), but the practitioner should transcend the scientist. For the scientist relies on measurement and analysis, on observation and deduction; but the physician, who is dealing also with imponderables and qualities that can neither be analysed nor filtered, should also be something of an artist, who is inductive and capable by instinct of assessing the imponderable. A generation or two ago the artist-physician was a not uncommon figure, and in rural areas the art of healing had often superseded the science of medicine. For a doctor who had lived all his life in a country parish had often forgotten his textbooks, but learnt instead the nature and constitution of his patients, and, like an artist using a familiar palette to paint a familiar landscape, he could create at least an illusion of health—until, perhaps, the following winter brought the old cough back.

But nowadays the pattern has altered. A young doctor does not often settle for life in a rural district, and even if he does his parish may become, within a few years, a metropolitan dormitory, or be flooded to supply a hydro-electric plant. A social revolution has also done something to change the relationship between doctor and patient; and under the benign provision of the National Health Service the doctor's skill has become a sort of public reservoir from which all may drink at any time so long as they pay their water rate; and from which many are allowed to drink free. They were certainly humane and generous minds that saw the need for an easier and wider distribution of medical skill and the comfort of a doctor's care; they were minds most generously and resolutely determined on the betterment of their fellow-men that devised the mechanism of the Act: but inevitably they changed the public character of the doctor by bringing him into a closer relationship with the State. Some part of the populace abused their new privilege—having paid their water rate, they left the tap running—and there were many doctors profoundly disquieted by the apparent division of their responsibility: on the one side the patient and their traditional loyalty to his interests, on the other their new paymaster, the State.

But the National Health Service is now almost ten years old, and I think it may be said that abuse has diminished, and disquiet been pacified. If this is so—and I can speak only with the slight authority of one who, being devoted to gossip, has gossiped over the years with a large number of people—if this is so, then the doctors themselves are chiefly entitled to the credit. They have—or the great majority have—resisted the temptation to which they were exposed: the temptation to become Civil Servants.

They realized the basic incompatibility between the ideal of the Civil Servant and the ideal of the physician: for the physician, to be honest, must from time to time behave as a most uncivil master. The young doctor may be disconcerted, on his entry into the professional world, to find malingerers among his patients. But he will find them. He will find hysterical patients, and gentle, amiable men and women who cultivate their neuroses as carefully as roses and cucumbers are cultivated for a horticultural show. And how is he to deal with them? The textbooks supply only part of the answer, and to complete it he must use moral courage: moral courage and perhaps ingenuity.

There was an Army doctor I once knew who had discovered, and practised, a very useful therapy for malingerers. He would listen attentively to their imagined symptoms, then examine, with an air of increasing gravity, some unexpected portion of their anatomy. He was, if I remember rightly, an Irish doctor. He would tell the man to return to duty, and report again in three days' time: "For if you are no better, I'm afraid there's nothing for it but an operation." And he would lightly describe an operation compared with which the martyrdom of a Christian saint was no more than a summer cold.

Glamour of Surgery

I do not know how effective such treatment would be in civil practice, but under proper controls it might be worth a trial. In our society, where so many who once enjoyed authority are now regarded without fear, the surgeon still inspires awe, enjoys the reverence of lesser men, and speaks in a voice that no one—save his own colleagues—can hear unmoved. The surgeon, out of increasing knowledge, increasing skill, and a boldness increasing to a calculated audacity, has acquired a craftsmanship at once so strong and exquisite that almost one can say there is no breakage that he cannot repair—no visible and material failure of organic communication that he cannot rectify—no gross but circumscribed invasion of the tissues that he cannot extirpate. There are specialists, indeed, who can improve on nature: alter the shape of a lady's nose, modify the fuliness of her cheeks, and reduce the number of her chins—and when, to his more solid achievements of removing a growing death from the abdomen or restoring to use a shattered joint there is added a dextrous ability to bring back a beauty that

nature (or a motor accident) has destroyed, why, there is little wonder that the surgeon is not only regarded with veneration but invested with glamour.

Here I should remind you that glamour is not properly the attribute of a film actress who happens to combine an unruly temperament with a nicely developed figure. The word "glamour" is merely a corruption of "grammar," for which film actresses care little; and grammar, before it became the menace of the elementary school room, could mean the occult learning of scholars. It could mean the magic art—and to the layman the art of the plastic surgeon is close akin to that.

Justice, however, compels me to add that the surgeon, no less than his patient, owes much to the modern anaesthetist: without the anaesthetist the surgeon would have fewer patients, and patients would have less admiration for the surgeon's skill.

The World of To-morrow

But it is not my intention to offer a conducted tour of the contemporary clinic, the modern operating-theatre: a task for which I am quite unqualified. I have merely been taking a sidelong glance at some aspects of the profession you are about to enter, and may adorn, with the purpose of suggesting that, while some of you may die of overwork, none of you need perish of boredom.

With the purpose, also, of reminding those of you whose studies have precluded much study of the ancient world, that mankind has had a fairly long history, and on the threshold of a new Promethean age it is useful to recall the old one, and realize that men not only survived the peril of fire, but tamed it and made it their servant, and built upon the crafts that fire made possible a long succession of civilizations. Many of these have disappeared—whether by ill fortune or the growth of their own iniquity it is now hard to tell—but a by-product of the Promethean ménage has outlived all the casualties of men, and is still with us, more exuberant than ever.

Hope, the miraculous survivor, came into the world—according to the myth—by the agency of Epimetheus, who was a fool, and Pandora, who was beautiful but silly; and Hope has been as good a servant to mankind as fire. I can find no explanation for her curious origin except in a theory put forward by my old friend, the late James Bridie, who was a good physician as well as a brilliant dramatist. He, in one of his plays, boldly asserted that "God is a very good biologist."

You may, of course, object that much of my argument is invalidated because Prometheus never existed; but that does not alter my case. For there was a Promethean age, and there is about to be another. And in the new world of to-morrow—among machines of hitherto unknown power, in the din of rockets taking-off for interplanetary space, between electronic brains that fortify the already dazzling intelligence of our scientists—in this new world mankind will still be subject to the ills and torments released from Pandora's box. You, as physicians, will have to deal with people who still suffer from all the old familiar diseases, as well as brand-new psychosomatic ailments of unknown origin—and in these circumstances, and with immortal Hope beside your chair, you may (I repeat) die of overwork, but it is quite unlikely that you will perish of boredom.

The October issue (Vol. 168, No. 10) of the *International Record of Medicine and General Practice Clinics* contains a symposium on medical writing. Dr. H. E. SIGERIST opens it with "Thoughts on the Physician's Writing and Reading." Then come papers by Professor HANS SELYE ("How Not to Write a Medical Paper"), the Editor of the *British Medical Journal* ("An Editor's Prejudices"), Dr. WALTER C. ALVAREZ ("Medical Writing"), and Dr. FÉLIX MARTI-IBANEZ, editor of the *International Record* ("Books in the Physician's Life").

SOCIAL CLASS SELECTION AND CLASS DIFFERENCES IN RELATION TO STILLBIRTHS AND INFANT DEATHS

BY

R. ILLSLEY, B.A.

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The effect of environment on stillbirths and infant deaths is usually assessed by comparing the rates of different social classes, class being defined in terms of the occupation of the husband—that is, the child's father. This index of environment provides no direct information about the wife, whose influence on the course of pregnancy, labour, and early infant care is more obviously relevant. Many primiparae have only recently married (Baird and Illsley, 1953), and may continue during pregnancy to live in their parents' home (Thompson, 1954); in such circumstances it would seem reasonable to base the wife's social class on her father's rather than her husband's occupation, thus providing a measure of her pre-marital environment.

A preliminary study of Aberdeen primiparae (Baird and Illsley, 1953) showed considerable interchange between social classes* at marriage, so that, for example, many daughters of skilled manual workers (Class III) married "upwards," to men in the professional and managerial classes (I and II), or "downwards" to men in semi-skilled or unskilled occupations (IV and V). Women who married into a higher social class were usually taller and in better health, were better educated, and came from smaller families than those who remained in the same class or who married into a lower social class.

Clearly, selective movement between classes at marriage, such that healthy well-grown women would tend to marry into higher social classes and small women with poorer health and physique into lower classes, might exercise a considerable influence on class differences in vital statistics. In the present paper this process is examined and its effect is shown on the rates of prematurity and obstetric death (stillbirths and first-week deaths) of the social classes in Aberdeen.

Method

All married primiparae resident and delivered in the city of Aberdeen between July, 1950, and December, 1954 (4,344 cases), were studied. Detailed medical and social data were available for 3,911 of these who booked for confinement in the Aberdeen Maternity Hospital. Less information was available for patients who booked for confinement in a private nursing-home (298), or in their own homes (113), and for those who made no booking arrangements (22). Certain analyses, therefore, are restricted to maternity hospital patients. Intelligence test data were obtained by Miss E. M. Scott in a special study of a sample of 278 hospital primigravidae (Scott, 1954).

The social class of the patient's father was based on his main occupation during the patient's school years.†

*Social class is based throughout on occupation, in accordance with the method used by the Registrar-General (1951).

†This information was not obtained for 63 patients, most of whom were delivered in the nursing-home or in their own homes. In a further 66 cases where the conditions of upbringing were variable or highly abnormal it was impossible to make a meaningful classification, even though a great deal was known about the patient's upbringing. The exclusion of these 129 patients made almost no difference to the prematurity and obstetric death rates of each husband's social class.

Throughout the paper Social Class I has been combined with Social Class II, and Social Class IV with Social Class V. This was necessary for simplicity of exposition and because the numbers in these classes, particularly in Social Class I, are too small for separate treatment. However, occupational groups were reclassified in various ways to test whether the pattern of selective interchange shown below persisted when the boundaries between classes were changed and when allowance was made for local peculiarities: for example, non-manual workers in Class III were grouped with Classes I and II, occupations connected with the fishing industry were excluded, etc. This produced changes of detail but did not affect the broad pattern of the results.

Results

Amount and Direction of Interclass Movement

Fig. 1 shows that there is considerable interclass movement at marriage, particularly between adjacent classes. Forty-six per cent. of women brought up in Classes I and II

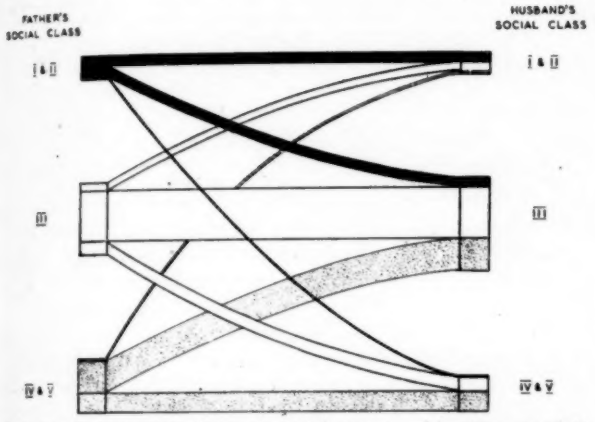

FIG. 1.—Intermarriage between social classes. Aberdeen married primiparae, 1950–4. The breadth of the lines is proportional to the numbers in each group.

married men in Class III, whilst 40% of the women married to men in Classes I and II were themselves brought up in Class III.* Movement between Class III and Classes IV and V is even more pronounced: 61% of women brought up in Classes IV and V married into Class III, whilst 41% of the women married to men in Classes IV and V were brought up in Class III.

Intermarriage between extreme classes is rare. Out of 648 women brought up in Classes I and II only 47 married into Classes IV and V; conversely, only 56 women out of 1,517 brought up in Classes IV and V married into Classes I and II. All told, such cases comprise only 2% of the total population. Detailed investigation shows that much of the extreme movement arises from anomalies in the method of social classification (Illsley and Thompson, 1955). For example, the daughters of shopkeepers or farmers are allocated by the Registrar-General to Class II irrespective of the size of the business or of the farm, but they often resemble Class III rather than Class II in their way of life. In such cases extreme movement between classes does *not* imply any extreme change in living standards or general social background. For this reason further attention is not paid to this small and rather anomalous minority; the main emphasis is placed on the larger groups who marry into the same or adjacent classes.

Features of Interclass Movement

Table I shows some social, physical, and obstetrical features of each social class group divided according to their class of upbringing and their class at marriage.

*The occupation of the wife's father relates to the wife's school years, whilst the husband's occupation refers to the date of birth of his first child. Some husbands may be promoted subsequently to a higher class.

School-leaving Age, Occupation, and Intelligence-test Grade.—In each class of upbringing, the groups who married husbands in Classes I and II contained the highest proportion of women who had remained at school beyond the minimum school-leaving age, or who had subsequently taken professional, highly technical, or clerical occupations; while the groups who married into Classes IV and V ranked lowest in these respects (Table I, A). Intelligence test results† showed a similar pattern, women marrying into Classes I and II obtaining the largest proportion of "above average" scores and those marrying into Classes IV and V obtaining the largest proportion of "below average" scores. Although the intelligence-test findings are based on a small sample, the results of an inquiry on 1,907 males in Stockholm showed a very similar pattern for the mean I.Q. of each social class group according to its class of origin (Boalt, 1955). These results are shown diagrammatically in Fig. 2, where the primary classification is class at marriage. This arrangement produces a fairly steady gradient for each

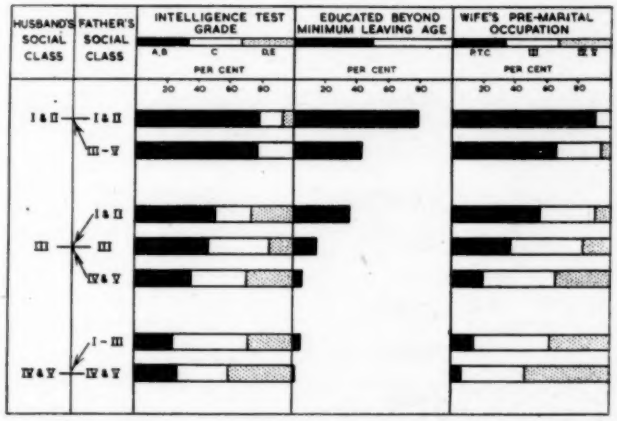

FIG. 2.—Interclass movement—intelligence, education, and pre-marital occupation. Wife's pre-marital occupation: P.T.C.= Professional, technical, and clerical. III=Shop assistants and skilled manual. IV and V=Semi-skilled and unskilled manual.

characteristic. Moreover, it appears that the groups which rise are not only superior in each respect to the remainder of their class of upbringing, but are also superior to the group brought up in the higher class whom they replace. For example, the group which rose at marriage from Class III into Classes I and II contains a higher proportion of intelligent, educated, and skilled women than the group brought up in Classes I and II which married into Class III. Thus, through the social selection occurring at marriage, women with these characteristics tend to become concentrated at the upper end of the social scale; and, conversely, women without them tend to concentrate at the lower end.

Physique, Health, and Height.—In Table I, B and Fig. 3 are given the heights of each class group, and an assessment of their physique and health made by senior obstetricians at the patient's first visit to the antenatal clinic. In each class of upbringing the women who married into a higher class tended to be taller, with better physique and health, than those who remained in the same class at marriage or who fell in social status. As with social characteristics, the women who married into Classes I and II from lower classes were on average taller and healthier than the women brought up in Classes I and II who married into lower classes (Fig. 3). And, conversely, the women who married into Classes IV and V tended to be shorter and less healthy than women brought up in Classes IV and V who married into Class III.

†Raven's progressive matrices (1938), a non-verbal test. A similar but more pronounced pattern was obtained with a verbal test—four subtests of the Wechsler-Bellevue intelligence scale (Scott, 1954).

TABLE I.—*Interclass Movement and Associated Characteristics*

Father's Social Class:	I and II			III			IV and V		
Husband's Social Class:	I and II	III	IV and V	I and II	III	IV and V	I and II	III	IV and V
A									
Intelligence test grade above average (%) ..	78·6	50·0	40·0	72·7	46·5	20·0	100·0	35·1	20·5
Cases	14	22	5	11	86	20	2	77	39
Left school after minimum leaving age (%) ..	78·9	35·6	9·3	48·8	15·7	4·7	13·6	6·1	1·2
Professional, technical, or clerical workers (%) ..	90·4	55·5	21·4	71·4	37·8	13·7	44·6	20·0	6·7
B									
Physique and health good or very good (%) ..	88·7	77·3	71·4	86·0	69·4	54·7	68·1	64·7	50·9
Cases	210	262	44	169	1,303	387	47	884	525
5 ft. 4 in. (162 cm.) or over (%)	50·2	34·1	22·9	42·9	29·1	19·9	37·5	23·9	21·2
C									
Prematurity rate (per 100 births)	3·6	6·0	12·8	6·3	6·4	11·5	8·9	8·0	11·0
Obstetric death rate (per 1,000 births)	29·8	23·4	42·6	16·7	33·6	56·0	—	34·9	55·0
Cases	302	299	47	239	1,400	410	56	916	543

Note.—Not all items of information are known for the whole population; intelligence test scores are available for a relatively small sample of the hospital population; the data on school-leaving age, and on the wife's occupation and her physique and health, refer to all married city primiparae booked for confinement in the Maternity Hospital; height and prematurity and obstetric death rates refer to all married city primiparae irrespective of the place of confinement.

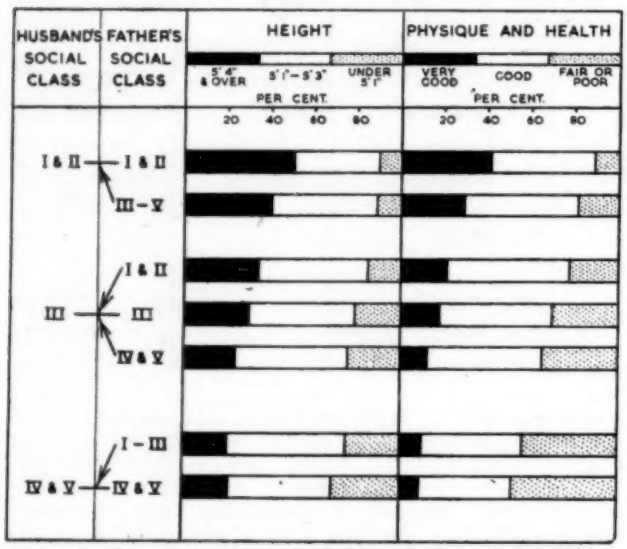

FIG. 3.—Interclass movement—height, physique, and health.

Prematurity and Obstetric Death Rates.—The prematurity and obstetric death rates shown in Table I, C and Fig. 4 follow a similar pattern. Within each class of upbringing the range of prematurity and obstetric death rates is wide, the highest rates occurring to those groups which married into Classes IV and V, the lowest rates to the groups which married into Classes I and II. The high prematurity rate in the group brought up in Classes III–V which married into Classes I and II is considerably influenced by the results of one year in which the prematurity rate for this group was 13.3 per 100 births—a high rate for any class and quite exceptional for Classes I and II. Omitting this year, the rate for this group would be 4.5 per 100 births. The relatively high obstetric death rate (30 per 1,000) in the group which was brought up and which also married into Classes I and II may result from small numbers, but it may also be a real phenomenon, for this group contains an unusually high proportion of women aged 30 or over at their first delivery; and the stillbirth rate tends to rise with maternal age. If we consider only women under 30 years of age the rate falls to 18 per 1,000.

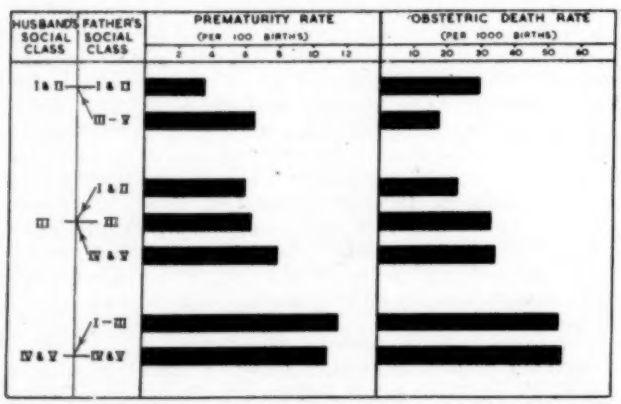

FIG. 4.—Interclass movement—prematurity and obstetric death rates.

Discussion

It is not surprising that women who married husbands in higher social classes than their fathers were likely to be of more than average intelligence (as measured by intelligence tests), to have spent longer at school, and to have been themselves in the more highly skilled and better-paid jobs. Intelligence and education, themselves closely related, are commonly recognized as qualities leading to professional and skilled occupations (Martin, 1954) and to the wider occupational and social contacts which favour a "good" marriage.

Good health and physique are also likely to be matrimonially advantageous. It is, however, not so easy to see why tallness should be associated with marriage into the upper occupational levels, nor why social mobility at marriage, both upwards and downwards, is associated with low and high prematurity and obstetric death rates, respectively.

The findings are, however, consistent with other socio-medical work undertaken in Aberdeen showing that social class, height, physique and health, intelligence, and nutrition tend, in primigravidae at least, to operate consistently together; low prematurity and obstetric death rates are to be expected when those factors are favourable, and vice versa (Baird, 1952; Illsley, Billewicz, and Thomson, 1954; Scott, 1954). The present data indicate that, at the time of marriage, women who rose in social status at marriage already possessed advantages in terms of growth, health, and education, and, as expected, women with these advantages were more efficient at child-bearing than women less well favoured.

The lower prematurity and obstetric death rates of women who moved up the social scale at marriage might result from improved social conditions (including medical care) between marriage and delivery. But this explanation could not apply to the differences in education, pre-marital occupation, and height, which are already determined at the time of marriage.

The data given in Table II for two groups of women who experienced little or no change in their immediate environment, or who had been exposed to a change for a short

TABLE II.—*Interclass Movement Among Women who Experienced Little Change in Living Conditions Between Marriage and Delivery. (Maternity Hospital Patients Only)*

Father's Social Class:	III		IV and V	
Husband's Social Class:	III	IV and V	III	IV and V
(a) *Patients living with their mother after marriage until delivery*				
Physique and health good or very good (%)	70·7	55·3	66·8	50·0
Prematurity rate (per 100 births)	7·0	12·8	7·2	11·5
Obstetric death rate (per 1,000 births)	30·3	63·8	31·4	63·7
No. of cases	330	94	223	157
(b) *Patients who conceived before marriage*				
Physique and health good or very good (%)	70·6	55·4	65·5	46·9
Prematurity rate (per 100 births)	7·3	12·1	10·2	15·1
Obstetric death rate (per 1,000 births)	28·8	56·7	41·0	57·3
No. of cases	313	141	244	192

Note.—Social Classes I and II have been excluded, since very few women in these classes conceived prenuptially and relatively few continued to live with their parents after marriage.

time only, suggest that it is also unlikely to apply to physique and health or to prematurity and obstetric death rates. Among these women, as in the population at large, those who moved up the social scale at marriage had better physique and health, and lower prematurity and obstetric death rates, than women who remained in the same class or who moved down. In other words, the association between interclass movement and health remains even when changes subsequent to marriage are slight.

Change of class at marriage appears seldom to involve a substantial change in living standards. Judged by their education, premarital occupations, and height, women who change class at marriage tend to resemble the class into which they marry rather than their class of origin. Detailed case studies (to be reported elsewhere) suggest that before marriage into Classes I and II women from Class III have already experienced a way of life more typical of Class I and II than of Class III. And, conversely, women who married out of Class III into Classes IV and V seem to have been reared more in accordance with the standards of Classes IV and V than of Class III. On this evidence, an abrupt change in living conditions at the time of marriage, capable of influencing to any important degree the course of child-bearing, is exceptional.

The use of the husband's social class in vital statistics tends automatically to focus attention on the conditions existing at the time of maternity. The present study suggests that the husband's social class has a much wider significance. Generally speaking, like marries like; for example, the wife of a professional man, irrespective of her father's social class, will normally possess before marriage the personal qualities, education, and social habits which fit her for that role. "Husband's social class" is useful as a research tool, not only because it accounts for the immediate way of life of a mother, but because it reflects her life history, the conditions of her upbringing, and her personal qualities. Without this very wide significance "husband's social class" would be much less useful in distinguishing groups with high and low rates of morbidity and mortality.

Effect of Marriage Selection on the Size of Class Differences

The total effect of marriage selection on the social class differences in our data is shown in Table III. For each characteristic the range between the highest and the lowest classes is wider when women are classified according to their husbands' rather than their fathers' occupations. Each class of upbringing (fathers') is highly heterogeneous in respect of the characteristics shown, and the differences between classes is consequently small. The upgrading at marriage of women with "superior" characteristics and the downgrading of women with "inferior" characteristics lead to less heterogeneity within classes and to a widening of class differences.

The results given hitherto have related solely to primiparae. The data presented in the last two lines of Table III, although based on an incomplete population, indicate, however, that the findings on primiparae apply to all parities.

Implication for National Stillbirth and Infant Mortality Rates

If Aberdeen experience applies elsewhere in Britain marriage selection must have a considerable bearing on the size of class differences found in national statistics. The disparity between the infant mortality rates of the social classes has remained almost constant since 1911 (Titmuss, 1943; Logan, 1954; Morris and Heady, 1955): the same is true of stillbirth rates by social class since 1939, the earliest year for which data are available (McKinlay, 1948; Logan, 1954). This failure of the social class "gap" to narrow has occurred despite the general fall in mortality rates and the social levelling of recent years consequent upon full employment, differential taxation, and the growth of welfare services (Seers, 1948; *Economist*, 1951; Hollingsworth, 1955; Morris and Heady, 1955).

The relative size of the social classes has, however, changed considerably over these years. Between 1931 and 1951 the number of married women aged 20–44 increased by 80%, 45%, and 38% in Classes I, II, and III respectively; in Class IV the increase was only 10%, whilst in striking contrast the number in Class V decreased by 25% (Registrar-General, 1938, 1954). This has occurred despite the fact that in 1931 the crude birth rate was much higher in Classes IV and V than in Classes I, II, and III. The great decrease in the size of Class V despite its high birth rate must have meant movement in an upward direction, made possible by changes in the occupational structure of the country, such as those resulting from increased mechanization. When so many opportunities existed for social advancement those who remained in Classes IV and

TABLE III.—*The Range of Class Differences*

Characteristic	Husband's Social Class				Father's Social Class			
	I and II	III	IV and V	Range	I and II	III	IV and V	Range
				Primiparae				
Intelligence test grade above average (%)	77·8	42·2	21·9	*55·9*	58·5	44·4	31·4	*27·1*
Left school after minimum leaving age (%)	59 6	14·4	3·0	*56 6*	50·5	16·3	4·6	*45·9*
Professional, technical, or clerical workers (%)	77·4	33·3	10·2	*67·2*	66·4	35·8	16·0	*46·4*
5 ft. 4 in. (162 cm.) or over (%)	46·1	27·8	20·7	*25·4*	40·7	28·8	23·4	*17 3*
Physique and health good or very good (%)	85 3	68·3	53·4	*31 9*	81·4	67·6	59·8	*21·6*
Prematurity rate (per 100 births)	5·2	6·9	11·3	*6 1*	5·4	7·4	9·1	*3·8*
Obstetric death rate (per 1,000 births)	21·8	32 8	54 9	*33·1*	27 8	36·2	40·9	*13·1*
				All Parities*				
Prematurity rate (per 100 births)	4·2	5·3	8·4	*4·2*	4·8	5·8	7·0	*2·2*
Obstetric death rate (per 1,000 births)	19 0	26·4	45·3	*26·3*	26·2	31·2	33·0	*6·8*

* Based on 5,121 cases delivered between July, 1950, and December, 1952 (79% of total births). The principal exclusions are patients delivered in their own homes or in the private nursing-home, for whom information on their fathers' social class was not available.

V or who married into Classes IV and V from a higher class must have been highly selected, either because their environment or training was particularly unfavourable or because their abilities were poor. If the Aberdeen experience is relevant, these movements would tend to concentrate in Classes IV and V women with poor physique and health, who have relatively high prematurity and obstetric death rates. At the same time continuous recruitment of healthy women into higher classes would lower the prematurity and obstetric death rates of these classes. In this way the process of social selection may continuously obscure the effects of social levelling by keeping open the gap between classes.

The inevitable delay in translating social improvements into improved health and the greater rapidity with which the upper social classes take advantage of new welfare services and advances in medical knowledge also tend to keep open the gap between classes,* so that it is impossible to assess quantitatively the influence of selective mobility on differences of mortality between the social classes. The Aberdeen figures and the amount of interclass movement occurring in the last 20 years suggest that the influence of selection may have been considerable. The Aberdeen data, however, relate only to an urban population in a single city over a short period of time, and the number of cases in the upper social classes is small. While there is no reason to suppose that either the occupational structure or the prematurity and obstetric death rates of Aberdeen are at all exceptional for an urban community, it is obviously desirable that the study should be repeated and extended to rural areas.

Nevertheless it is clear that a comparison of social class differences at two points in time—for example, between census years—is misleading, because of changes in the composition of classes and selective interchange between classes. The persistent gap between the mortality of the various social classes, defined in occupational terms, does not necessarily mean that the social levelling of recent years has been ineffective. The use of another social classification less affected by selective mobility or by changes in occupational structure might well show that the difference between classes has narrowed.

Summary

A socio-medical investigation of Aberdeen primiparae has shown that women who rise in social status at marriage tend to be of superior intelligence, education, and occupational skill. Such women also tend to be tall, to be in good health, and to have low prematurity and obstetric death rates. Conversely, women whose social status falls at marriage tend to have the opposite characteristics. Social status is defined in terms of the occupation of the patient's father and of her husband.

This selective interchange between classes at marriage tends to accentuate class differences, and is partly responsible for the continuing disparity between the mortality rates of the Registrar-General's social classes, despite the social and economic changes of recent years. These classes are changing in composition and size, and movement between them is highly selective, so that comparison of class mortality rates at different periods of time may give misleading results.

I am indebted to Professor D. Baird for help at all stages of this inquiry; to the almoners' department of the Maternity Hospital, and especially to Miss B. Thompson, for social data on hospital patients; to the Medical Officer of Health for Aberdeen, the matron of the Rubislaw Nursing Home, and the general practitioners of the city for data on women confined in their own homes or in the nursing-home; and to Mr. D. Allcorn, Mr. W. Z. Billewicz, Dr. J. N. Morris, Dr. I. M. Richardson, and Professor R. M. Titmuss for advice and criticism.

*For a fuller discussion of these influences see Morris and Heady (1955).

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NECROBACILLOSIS IN GREAT BRITAIN*

BY

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The micro-organism most commonly known as *Bacillus necrophorus* causes various lesions in wild and domestic animals but is not often found in human infections, although in human beings it may produce a fatal suppuration.

The organism belongs to a group which has not yet been fully explored and which has come into existence through the realization that various bacteria described and named as the cause of different diseases in animals and in man are very similar. The first name given to the organism was bacillus of calf diphtheria, by which Loeffler (1884) called a bacillus which he saw in lesions in the throats of calves and in lesions in rabbits and mice which he infected by material from calves' throats. Other names which are now considered to be synonyms are *Bacterium necrophorum, Fusiformis necrophorus, Bacteroides necrophorus, Actinomyces necrophorus, Streptothrix necrophora*, Bang's necrosis bacillus, *Streptothrix cuniculi, Actinomyces cuniculi, Bacillus filiformis, Bacillus funduliformis, Bacteroides funduliformis, Bacillus pyogenes anaerobius*. Domesticated animals that are known to be subject to the infection include cattle, sheep, goats, deer, horses, pigs, rabbits, guinea-pigs, dogs, monkeys, and poultry; and various wild animals have also been found to be infected (Albrecht, 1929). The diseases may be epizootic or sporadic and local or widespread in the different species. Thus, as well as calf diphtheria, we have necrotic stomatitis of calves, lambs, and pigs, foot-rot of cattle and sheep, gangrenous dermatitis of horses and mules, multiple abscesses of lungs and liver of cattle and pigs, post-partum necrobacillosis of the vagina and uterus of cows, and navel-ill in calves born from them (Cunningham, 1930).

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Types of Human Infection

Authenticated human cases have already been reported (in the approximate numbers given after each country) from Germany (94), U.S.A. (87), Hungary (24), Holland (15), Great Britain (10), France (31), French Indo-China (6), Scandinavia (2). This total of 269 cases does not include nine infections referred to but not described in the paper on one fatal case by Alston *et al.* (1938). The names of the authors of case histories from each country are given with the other references below. Most of the lesions recorded in human beings can be divided into four groups. The first, and smallest, comprises instances of infection of the skin or subcutaneous tissues. These cases include two men infected during experimental work with the organism derived from infected rabbits (Schmorl, 1891), a meat inspector who scratched himself on the tooth of a dead infected sheep (Stemen and Shaw, 1910), a farm worker who was bitten by an infected cow (van Wering, 1923), a veterinarian infected during manual removal of the placenta of a cow (Wohlstein, 1929), and a girl, employed in a butcher's shop, who had a deep infection of the right middle finger (van Gelder, 1930). Similar to these are infections of war wounds of 24 soldiers reported from Hungary (Bogdán, 1916), infection of a sailor reported in Britain (Forbes and Goligher, 1944), and an infection of a civilian at the site of a stab wound in the shoulder six months after the wound had healed (McVay and Sprunt, 1952).

The second, larger, group is of cases in which infection started in the region of the throat, sometimes after tonsillectomy or with sore throat or otitis media as a first symptom. Thirdly, there are many infections by way of the female genital tract, mostly after abortion or in the puerperium, and fewer, in either sex, by the alimentary tract, sometimes after surgical operation, or by the urinary tract. The fourth group has shown empyema—with or without lung abscess—as the first lesion. The reason for this comparatively large group is not clear, but it has been suggested that when lung abscess precedes empyema, inhalation from the mouth or throat may be the origin of the infection. In the last three groups general pyaemia and abscesses have occurred in very many situations.

In our experience of 12 cases there have been purulent meningitis, lateral sinus thrombosis, otitis media, peritonsillar and sublingual abscess, extensive suppuration of the neck and mediastinum, lung abscess, empyema, abscess of the spleen, abscess in the broad ligament of the uterus, abscess of knee-joint, and osteomyelitis of the femur. Bacterial endocarditis was found in two patients by Fisher and McKusick (1953); in a group of 20 cases, Smith and Ropes (1945) include peritonitis, prostatitis, salpingitis, and hepatic and renal abscesses; and several authors—for example, Harris and Brown (1927); Joe *et al.* (1937)—have recorded suppuration of the wound after caesarean section or of the uterus after vaginal delivery.

It is only in the first five patients of the first group that the origin was traced directly from particular infected animals. In the other groups, although a small number of the patients worked among animals or in rat-infested premises or handled meat, a source of infection from an animal was not demonstrated. There is not enough knowledge of the presence of the organism in healthy people. Joe *et al.* (1937) stated briefly that they had obtained the organisms from the cervical swabs of several presumably healthy patients. This has not been my experience in examining many anaerobic cultures from the cervix with this in mind and after examining carefully the tonsils from 50 cadavers without finding the organism. However, Dack *et al.* (1938) isolated 19 strains of the organism from the colons of patients with chronic ulcerative colitis, several of whom had an ileostomy; this is evidence of the presence of the organism in the intestine and of its increase in some abnormal conditions, but it is not generally accepted as showing a causative connexion between the bacillus and chronic ulcerative colitis. It indicates the source of infections which begin after operations on the intestine, and it may have a relation to the infection of the female genital tract.

Lemierre *et al.* (1938) reviewed more than 30 human infections due to *B. funduliformis* (*B. necrophorus*), and considered that the organism is an inhabitant, potentially pathogenic, of the throat and of the gastro-intestinal and urogenital tracts. Ernst (1951) cultured the organism from 86 patients who had chiefly pelvic infections due to it, and he thought that the organism might be saprophytic in the vagina. It is possible that the organism may enter the alimentary tract from animal sources and remain a saprophyte until a circumstance like tonsillectomy, operation on the intestine, or parturition offers a chance of invasion of the tissue.

The only cases in which an incubation period can be accurately known are four cases in the first group. In one, inflammation and severe pain followed within two days of scratching a finger on an infected sheep's tooth, and five days after the scratch there was coagulation necrosis on the back of the hand, with bullae, and the hand and arm to the shoulder were swollen. This contrasts with the slower course in the patient bitten by an infected cow, for it was three weeks before the first lesions—small abscesses—were seen at the site of the bite, and a week later lymphangitis began and involved the axillary gland. The veterinarian developed a lesion on his forearm three days after removing the cow's placenta, and it may be that the infection lay dormant for six months in the healed wound of the stabbed man.

After abortion or childbirth the period of incubation can usually be presumed, but one cannot be sure that infection may not have occurred later than the time of delivery or abortion, or of the interference to cause abortion. The same applies to infections following tonsillectomy. Harris and Brown (1927) described six puerperal cases; in one the temperature was raised when delivery was made, and in the others on the first, second, and third days of the puerperium, and suppuration followed in a few days in four cases. Beeuwkes *et al.* (1951) described a case of inflammation beginning in a laparotomy scar two years after the operation. One case in the present series twice had empyema at the same site, with ten years between the occasions, and the second illness is believed to have been due to latent infection in a sequestrum of bone. These examples show the great variation between almost immediate infection and long latency.

Mortality

The illness also varies greatly in the rapidity of its course. In six fatal cases which we have observed, death occurred 6 days, 19 days, 3 weeks, 4 weeks (twice), and 7 weeks after the onset.

There were no fatalities from the local infections (other than war wounds) mentioned in the first group; but fatal cases have been reported in each of the other groups. An estimate of the case mortality rate of all reported cases cannot give a good picture of the seriousness of the infection because the literature consists to a large extent of small numbers of serious—often fatal—infections. However, those who have been on the look-out for the organism have collected cases of differing degrees of severity. McVay and Sprunt (1952) found 35 cases in five years: 21 patients (60%) were seriously ill and 6 (17%) died. These deaths were distributed over all the groups except the first group of skin infections, in which McVay and Sprunt had one patient, who survived. Among their patients were 13 in whom infection was by the female genital tract, and, of these, two died; to these 13 may be added the six puerperal cases of Harris and Brown (1927) with one death, making, in the two groups, 19 puerperal patients with 3 (16%) deaths. On the other hand, Lemierre *et al.* (1938) obtained from the literature (chiefly French) more than 30 cases of minor infections arising from the tonsils and the genito-urinary tract with very few deaths. Among 12 patients known to us in London there were 7 (58%) deaths; with 9 other cases of

infection in Britain recorded in the literature, the total of 21 infections in this country resulted in 13 deaths (62%). These figures may indicate that many less severe infections have been missed in Great Britain.

Diagnosis and Prognosis

The diagnosis of this infection may be suggested by the peculiar odour—like Limburger or overripe Camembert cheese—of pus produced by it. If there is no pus, sputum, or uterine secretion to culture, and the organism is not found in a blood specimen, the infection is rarely suspected, and the illness is regarded as general bacterial toxaemia, septicaemia, or pyaemia. A polymorphonuclear leucocytosis occurs in most cases. Jaundice sometimes develops, and liver atrophy or Weil's disease may be suspected.

The prognosis in individual cases depends on the extension from the primary site and the multiplicity of metastatic lesions. Strains of the organism have been found to differ from one another in sensitivity to antibiotic drugs, but several were found sensitive to penicillin (Ruys, 1947), others to chlortetracycline (McVay *et al.*, 1949). Fisher and McKusick (1953) tested strains from 14 patients and found that 10 were sensitive to penicillin (from 0.1 to 50 units per ml.), 6 were sensitive to chloramphenicol (from 0.2 to 3.1 μg.), 7 to chlortetracycline (1.6 μg. or less), and 3 to oxytetracycline (0.1 to 1.6 μg.); 7 strains were comparatively or highly resistant to streptomycin. I found that the strain isolated from a patient in 1944 was sensitive to crude penicillin, and the strain from the same patient ten years later was sensitive to penicillin, streptomycin, chlortetracycline, chloramphenicol, and sulphonamide; and from the relatively few recorded cases treated with these drugs it seems clear that the prognosis is much improved by the possibility of this treatment (Cooper and Robson, 1947; Fisher and McKusick, 1953). Organisms, especially anaerobic streptococci, often accompany *B. necrophorus* in the lesions and may differ from *B. necrophorus* in drug sensitivity; they should be tested separately if necessary.

Biological Features of the Organism

In pus *B. necrophorus* is found as a short, slender, Gram-negative, non-sporing bacillus, not acid-fast, 1.5–2 by 0.5 μ, often staining in a granular fashion and resembling very closely *Haemophilus influenzae*. The morphology in cultures is very variable and includes filaments of up to 50 or 100 μ, with fusiform or globular swellings. By electron microscope, the organism was seen to reproduce by multipolar germination from large round bodies, as pleuropneumonia-like organisms do (Smith *et al.*, 1948). There is no confirmed evidence of branching of filamentous forms to justify the name of actinomyces or streptothrix, nor, in my experience, were tapering forms found to account for the name fusiformis.

For artificial growth, anaerobic conditions are relatively strictly necessary and plate cultures may die after exposure to air for 12 hours. Beveridge (1934) showed that anaerobic conditions for growth and survival are modified by the presence in cultures of certain other organisms, such as staphylococci. Growth is absent or poor in unenriched medium, and blood or serum is usually added to broth or agar. Cooked-meat medium under paraffin oil promotes growth and survival well. Growth takes two to four days to reach its maximum in most media. On solid media the colonies are by that time up to 2 mm. in diameter, transparent, and even in outline; later they may show a thinner extension of growth; many strains are haemolytic. In fluid media the growth is often flocculent but may be of even turbidity. All cultures have the strong, cheesy smell of the pus. If cultures on a solid medium are kept in the incubator for three weeks or more, darkening of the centre of colonies may occur. I do not know whether this is due to a pigment, but it serves to call to mind the organism of similar characteristics and pathogenicity to which Oliver and Wherry (1921) gave the name *Bacillus melaninogenicum*, on account of the production of melanin in the colonies.

From three of the patients in our series (Cases 1, 2, and 9) *B. necrophorus* was isolated in pure culture from all or some of the lesions, and these cultures remained pure on subculture; but from most of the others (Cases 3, 5, 7, 8, 10, 11, and 12) other bacteria—almost always streptococci—were found in the primary cultures in addition to *B. necrophorus*. It was found not only that there were colonies consisting entirely of streptococci but that it was impossible to be sure of obtaining a strain of *B. necrophorus* which remained free from streptococci in one or other of its subcultures. This association of symbiosis or, possibly, variation needs more study. The streptococci were not haemolytic and some were viridans.

Fermentation tests of different strains of *B. necrophorus* from human and animal sources have given different results, with some frequent patterns of reactions in some groups—for example, Beveridge (1934). I found that one human strain fermented lactose, saccharose, glucose, maltose, dextrose, raffinose, inulin, galactose, and laevulose, but not dulcite, arabinose, adonite, inosite, or salicin; another strain fermented none of these.

Serological tests have shown that different serotypes exist among strains from various sources in human beings and animals (Orcutt, 1930; Beveridge, 1934; Walker and Duck,

Cases of Necrobacillosis in Great Britain

Sex and Case	Age (Years)	Length of Illness (Weeks)	Principal Lesions	Result	Site of Entry	Year of Occurrence	Publication
F	18	14	Mastoiditis, extradural abscess	D.*	Tonsil		Franklin (1933)
F	5	4	Otitis media, empyema, lung abscess	D.	Throat		"
F	28	7	Uterine sepsis, pyaemia, empyema	D.	Genital tract		Joe *et al.* (1937)
F	24	4½	Uterine sepsis, empyema	D.	" "		" " " "
F	—	—	Infection of caesarean section	S.*	" "		" " " "
F	—	—	—	D.	" "		" " " "
F 1	5	3	Meningitis, lung abscess, empyema	D.	Tonsil	1933	
M 2	27	4	Empyema	D.	?	1934	
F 3	29	7	Parametritis, splenic abscess, empyema	D.	Genital tract	1934	
F 4	19	17	Empyema	S.	?	1935	
M 5	32	4	"	S.	?	1935	
M 6	65		Arthritis of knee, pyaemia	D.	?	1935	
M 7	42		Abscess of neck	S.	? Tonsil	1936	
M 8			Peritonsillar and sublingual abscess	S.	Tonsil	1936	
M 9	29	3	Abscess of neck and of lungs, empyemata	D.	"	1938	Alston *et al.* (1938)
M 10	36	1	Osteomyelitis of femur, pyaemia, pneumonia	D.	?	1938	
M 11	55	4	Abscesses, also carcinoma, of lungs	D.	?	1941	
F 12	17	12	Abscess of R. lung; L. empyema, gluteal abscess	S.		1944	
	27	5	L. empyema and abscess of chest wall			1954	
M	24	12	Infection of wound of leg; lung abscesses	D.	Wound of leg		Forbes and Goligher (1944)
F	29	9	Abortion, thrombosis of iliac veins	S.	Genital tract		Jones (1944)
F		3	Normal delivery, toxaemia and septicaemia, anaemia	S.	? Genital tract		Cooper and Robson (1947)

* D. = Died. S. = Survived.

1939). Unfortunately, most of our strains were lost during the war, before serological tests were successfully made.

Experimental infection of rabbits and mice has shown different degrees of virulence in strains isolated from human sources. I found that three cultures from separate patients produced large slow-growing abscesses at the site of injection in the hind legs of rabbits and small multiple abscesses in the peritoneal cavity of mice when injected intraperitoneally; in both species of animals there was not much general disturbance of health. Other workers have produced fatal pyaemic infection by intravenous injection.

In Great Britain I have found records, in the literature and in our own experience, of 21 patients suffering from this infection. (These include nine referred to, in summary, in the report of one case by Alston *et al.*, 1938.) Some details of these infections are given in the Table. Short accounts are given of 11 of the cases of the present series and a more detailed record of the patient (Case 12) who had two illnesses with an interval of ten years.

Outline of 11 Cases in which B. necrophorus was Isolated in Pure or Mixed Culture (see Table)

Case 1.—A girl aged 5 (Dr. D. M. Morrison, Highgate Hospital). The fatal illness began with acute otitis media on the left side four days after tonsillectomy. Acute meningitis followed ten days later, and the patient died after an illness of three weeks. Necropsy revealed left-sided otitis media and cerebral meningitis, and several small abscesses in one lung (Dr. A. B. Bratton). Bacteriological examination was made of cerebrospinal fluid, pus from left lateral venous sinus and left middle ear, and fluid in one lateral ventricle. In all of these *B. necrophorus* was found in pure culture. In a lung abscess the same organism was found in company with other bacteria.

Case 2.—A man aged 27 (Dr. B. Barling, St. Mary's Islington Hospital). The fatal illness was pleurisy and empyema of the left side, of one month's duration. Large amounts of fluid were aspirated on three occasions. This exudate was purulent and became thicker in consistency and more foul-smelling as the illness progressed. Bacteriological examination of the pleural exudate showed very large numbers of small Gram-negative bacilli, which on culture gave a pure growth of *B. necrophorus*. No post-mortem examination was made. The route of infection was not known.

Case 3.—A woman aged 29 (Dr. W. M. Turtle, St. Mary's Islington Hospital). The fatal illness lasted seven weeks. It was first diagnosed as influenza and rheumatism; and two weeks later a miscarriage occurred following patient's own efforts to produce it. A very toxic state with high temperature and offensive vaginal discharge followed. Empyema of the left pleural cavity developed, and a large amount of offensively smelling pus was removed from it by aspiration before death. At post-mortem examination a puncture wound was found in the right vaginal fornix and it communicated with an abscess in the right broad ligament. An abscess the size of a golf ball was present in the spleen, and there was extensive empyema in the left pleural cavity (Dr. A. B. Bratton). This patient had worked in the meat trade as a ham-washer, and after her death it was suggested that abortion may have been caused by a meat skewer. Bacteriological examination was made of the pus from the empyema (before and after death) and of pus from the abscesses in the spleen and broad ligament after death. In all of these *B. necrophorus* and *Str. viridans* were found by film and culture in large and approximately equal numbers.

Case 4.—A girl aged 19 (St. Leonard's Hospital). The illness was left-sided pleurisy, with empyema, and it lasted 17 weeks. Complete recovery was made. Large quantities of foul-smelling pus were removed by aspiration and, later, by drainage by tube. Bacteriological examination of pleural exudate showed filamentous bacteria in large amounts, and, although *B. necrophorus* was not obtained in direct culture, abscesses were produced by subcutaneous inoculation of mice and *B. necrophorus* was obtained in culture from them.

Case 5.—A man aged 32 years (St. Leonard's Hospital). This illness was pleurisy and empyema of the left pleural cavity which began acutely, and recovery occurred in about a month, after aspiration and drainage by tube. The pus removed was copious and very foul-smelling. *B. necrophorus* and non-haemolytic streptococci were isolated in large and approximately equal numbers from the pleural exudate. The route of infection was unknown. The patient had cleaned stables for a time up to nine months before his illness.

Case 6.—A man aged 65 (Dr. K. S. May, St. Leonard's Hospital). This fatal illness was general pyaemia with purulent arthritis of a knee-joint from which *B. necrophorus* was isolated. (The full notes of this case were lost during the war.)

Case 7.—A man aged 42 (Mr. Norman Tanner, Highgate Hospital). This patient recovered from an abscess of the neck from which *B. necrophorus* and non-haemolytic streptococci were isolated.

Case 8.—A man (St. Mary's Islington Hospital). This patient had peritonsillar and sublingual abscesses from which *B. necrophorus* and many other organisms were isolated. He recovered.

Case 9.—A man aged 29 (reported by Alston *et al.* (1938), Bethnal Green Hospital). This acute fatal illness appeared to originate from a septic tonsil leading to a large abscess in the right side of the neck, followed by pulmonary abscess and bilateral pyopneumothorax. The abscess in the neck surrounded and invaded the internal jugular vein. *B. necrophorus* was obtained from the blood in pure culture during life, and in pure or mixed cultures from several specimens of pus at necropsy. The site of entry of the infection was almost certainly the tonsil, and gross dental sepsis and pyorrhoea may have had a part in the entry of the bacillus into the tissue.

Case 10.—A man aged 36 (Mr. R. Blunden, St. Mary's Islington Hospital). This fatal illness of six days began with acute arthritis of the right knee which was surgically drained, pus containing *B. necrophorus* being obtained. Blood transfusion was given, jaundice developed, and, at necropsy, osteomyelitis of the right femur and septic pneumonia and pyaemic abscesses were found. No site of entry of the organism was shown.

Case 11.—A man aged 55 (Dr. B. Freedman, Archway Hospital). This fatal illness lasted four weeks and was the climax of ill-health for more than a year, beginning with pneumonia which was followed by a "cough with an unpleasant taste" and grey sputum sometimes blood-stained. The patient was very ill and wasted. There were large and hard lymph nodes in the left axilla and dullness at the base of the right lung. *B. necrophorus* was cultured from pus at the right side of the chest posteriorly. At necropsy were found carcinoma of the bronchus in the lower lobe of the right lung, fibrosis and abscesses in the same lobe, and bronchopneumonia and abscesses in the left lower lobe (Dr. A. B. Bratton).

A fuller account follows of Case 12, the patient who had a recurrence of her illness.

Case 12

The patient was aged 17 at the time of her first illness, which began near the end of February, 1944, with cough, malaise, and pains in the back. She was admitted to an isolation hospital on suspicion of diphtheria and discharged after a few days with a diagnosis of tonsillitis. She came to St. Mary Islington Hospital (Dr. E. D. Maunsell) on March 9, when she was acutely ill and mentally apathetic; her temperature was 103.4° F. (39.7° C.). There were signs of pleural effusion on the left side and a small pressure sore

over the sacrum. On March 13 radiography showed a large cavity with a fluid level in the upper lobe of the right lung and a left pleural effusion. On March 15 and 17 the left pleural cavity was explored by needle, and each time thick offensive greenish pus was obtained. Large numbers of *B. necrophorus* were obtained in anaerobic culture of this, with a few colonies of *Staphylococcus aureus*. On the 18th radiography showed the abscess cavity in the right lung to be smaller and the effusion shadow on the left side had reached the seventh rib posteriorly. On the 21st Mr. Blunden resected a portion of the left tenth rib and inserted a tube for closed drainage. On the 28th Mr. Blunden opened and drained very offensive pus from a large abscess. From that time the temperature abated and recovery advanced.

On April 17 radiography showed a bronchopleural fistula in the left lung and a cavity still present in the right lung, and on May 11 pleural thickening on the left side and the cavity on the right side. She remained in hospital until May 18, when movement in the left side of the chest was good and the percussion note resonant; there was a small sinus at the drainage site. In hospital, she showed at first moderate anaemia of 70% haemoglobin, which improved to 86%, and polymorph leucocytosis of 26,900 and 18,400 per c.mm. *B. necrophorus* was not detected in sputum which was examined early in the illness. In June, as an outpatient, her sinus was seen to be healed; she had lost much of her hair. In November she was very well, had no cough, and her hair was growing again.

The patient remained well for ten years and married. She noticed an occasional twinge of pain in the left side of the chest.

When readmitted to hospital in the care of Dr. A. L. Jacobs, on April 17, 1954, she was 27 years old. She had been ill for four days with fever, headache, anorexia, and vomiting, and had a cough with yellow sputum. She was anxious, had slight dyspnoea, a flushed face, and labial herpes; her temperature was 101° F. (38.3° C.). The chest showed impaired movement on the left side and a dull percussion note at the left base posteriorly. Immediately above the old thoracotomy scar there was a swelling 5 cm. in diameter, red, tender, and slightly fluctuant. Radiography showed an encysted pleural effusion at the base of the left lung. Penicillin ("estopen," changed later to "distaquaine" penicillin) was given from admission for 14 days and sulphadimidine, 1.5 g. daily, orally for the first five days, and then was replaced by streptomycin, 0.5 g. eight-hourly. On April 19 there was continuing fever and tachycardia, and 20 ml. of offensive thick yellow pus was aspirated. On the 21st Mr. P. T. Savage incised the old scar and evacuated 150 ml. of pus; he explored the empyema cavity by finger and found that it reached 3 in. (7.5 cm.) upwards and contained a small rib sequestrum; a tube for open drainage was put in.

Bacteriologically the pus showed a small number of Gram-negative bacilli and filaments and no acid-fast bacilli; aerobic culture gave no growth and anaerobic culture produced *B. necrophorus* and a Gram-positive coccus from which the *B. necrophorus* could not be separated. The organisms were both sensitive to penicillin, sulphonamide, chlortetracycline, chloramphenicol, and streptomycin. After drainage the temperature fell and the patient rapidly improved, being discharged from hospital on May 16. A radiograph in July showed only slight pleural thickening at the left base and a resected rib with regeneration. During this illness there was anaemia, with 77% haemoglobin, and the leucocytes numbered not more than 7,500 per c.mm. *B. necrophorus* was not found in the sputum.

Summary

An account is given of the bacteriological features of *B. necrophorus* and of the types of suppurative infections in men and animals in which it has been found. Approximately 280 human cases have been found in the literature and in the present series; 21 of the patients have been in Great Britain.

Among the 12 patients in our experience 7 died and 5 survived. One of the survivors had an empyema on the left side on two occasions—the second ten years after the first.

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SENSITIVITY OF FOUR SPECIES OF BACTEROIDES TO ANTIBIOTICS

BY

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The genus here referred to as *Bacteroides* (also known as *Fusiformis* and by other names) consists of Gram-negative non-sporing anaerobic bacilli. These are inhabitants of the mouth and lower bowel, and may be found in infections of various parts of both alimentary and respiratory tracts, the uterus, and other organs; such infections are often mixed but sometimes pure, and of every degree of severity from the quiet local necrosis of Vincent's gingivitis up to septicaemia.

There is perhaps no genus of common pathogenic bacteria which has been so little studied except by a few specially interested workers. Their isolation is difficult and their precise identification often much more so. Although they are almost invariably present in any foul-smelling material from the mouth, lung, or a lesion—such, for instance, as a gangrenous appendix—in the lower alimentary tract, it is exceptional for any attempt to be made to identify them.

It is hence not altogether surprising that information about their sensitivity to antibiotics should be fragmentary; few such tests have been made, but the value of some is also diminished by the use of an incomplete range of concentrations or by failure to identify the organisms. Beigelman and Rantz (1949) give an admirable picture of the nature of *Bacteroides* infections in their account of 47 cases, but they did not attempt species identification or use any concentration of penicillin exceeding 0.1 unit/ml. in testing sensitivity. Rantz (1951) also describes a case of bacterial endocarditis due to an unidentified strain that was resistant to 1 unit/ml. of penicillin, and inhibited by 10 and 1 μg./ml. respectively of streptomycin and oxytetracycline: treatment with the latter for 66 days effected a cure.

Bacteroides funduliformis (*necrophorus*) is the subject of six papers in which sensitivity to antibiotics is reported: the results are given in Table I.

Bacteroides fragilis was tested under this name by only two authors: Marson and Meynell (1953) found a single strain from a patient with pylephlebitis to be inhibited by 20 units of penicillin per ml., and 25, 5, 0.1, and 0.4 μg./ml. respectively of streptomycin, chloramphenicol, chlortetracycline, and oxytetracycline: chlortetracycline was successfully used in treatment. King *et al.* (1952) found the inhibitory concentrations for one strain to be streptomycin 250, chloramphenicol 0.47, and chlor- and oxytetracycline 0.11 μg./ml.: a result for penicillin is not given.

TABLE I.—*The Sensitivity of Bacteroides necrophorus to Antibiotics*

Authors	No. of Strains	Inhibitory Concentrations of			
		Penicillin	Streptomycin	Chloramphenicol	Chlortetracycline
Cooper and Robson (1947)	1	0·5			
Ruys (1947) ..	2	0·5			
Ernst and Hartl (1951)[1] ..	"A great number"	>10	>10		0·31–0·62
McVay and Sprunt (1952)[2]	14	>2–>10	75–>250		2–40
King *et al.* (1952)	1				3·9
Fisher and McCusick (1953)[3]	5	<0·2–50	50–625	1·6–6·3	<0·19–1·6

Penicillin concentrations are in units/ml., the remainder in μg./ml.
[1] Concentrations for streptomycin and chlortetracyline stated as mg.%, but are presumably meant to be μg./ml.
[2] It is not clear in this paper whether all the strains examined were considered to be of the same species.
[3] Only 5 of the 14 strains were identified as *Bacteroides necrophorus*: the values stated are those for these five, with a possible omission because it is not clear which of two strains from one patient was so identified.

According to Foley (1947) four strains of *Bacteroides funduliformis* and eight of *Bacteroides fragilis* were all resistant to 100 units of penicillin per ml. and inhibited by streptomycin only in concentrations of 1,500–4,000 μg./ml. It seems that these depressing results may have been due to the use of a medium containing thioglycollate in which the antibiotics were inactivated, although the author considers this possibility and discounts it.

According to Willich (1952), "*Bact. pyogenes anaerobium* (Buday)" is the most important member of the "funduliformis group," and four strains of it were resistant to 2 units of penicillin per ml., and inhibited by streptomycin, chloramphenicol, and chlor- and oxytetracycline in concentrations of 250, 1–3, 1, and 6 μg./ml. respectively.

A general impression conveyed by these findings is that *Bacteroides* are sensitive to the tetracyclines and chloramphenicol, particularly the former, and relatively much more resistant to streptomycin. On the other hand, the data are highly discordant on the action of penicillin, the antibiotic likely to be used for most infections in which these organisms are concerned. Moreover, they refer to only two identified species. It therefore appeared desirable to test an adequate number of strains of several species by a uniform method in the hope of clarifying this subject.

Materials and Methods

Most of the organisms studied were recovered from cultures made for diagnostic purposes on blood agar and incubated in McIntosh and Fildes jars anaerobically with 5% added CO_2 for periods up to one week.

Bacteroides fragilis.—This species was recognized by its regular morphology and translucent circular colony with entire edge, and its identity was confirmed by showing that it produced H_2S in broth, gas from serum peptone water, and no indole. Of the 23 strains examined, one was No. 8560, N.C.T.C., the remainder were all isolated from abdominal lesions, either in direct association with the lower bowel or in areas liable to contamination from it (appendicitis, pelvic abscesses, stitch abscesses following abdominal operations, etc.). An appearance in a penicillin-sensitivity test-plate suggested that one strain of this organism formed penicillinase: this was confirmed by adding a liquid culture of it to penicillin solution, which was found to be destroyed. Of eight other strains available at that time, one also behaved in this way: the remainder did not. Penicillinase formation by this species has not been recorded before.

Bacteroides fusiformis (*F. fusiformis*, Vincent's fusiform bacillus).—This organism was recognized by its morphology, which was perfectly retained in culture, and by its characteristic umbonate colony with an arborescent periphery and irregular edge. This species was found more difficult to isolate and maintain than any other. Despite the kindness of my colleagues in the dental department, which I gratefully acknowledge, in sending me cases of Vincent's gingivitis, only four strains from this source survived long enough to be tested. Of two others, one was obtained from the sputum of a patient with lung abscess, and one from pus from cervical actinomycosis with accompanying bacterial infection.

Bacteroides necrophorus (funduliformis).—Of the four strains examined, one was No. 7155, N.C.T.C., for one I am indebted to Dr. J. M. Alston, and for two to Dr. Per Holm, of the State Serum Institute, Copenhagen.

Bacteroides melaninogenicum.—This organism was first described by Oliver and Wherry (1921), and later more fully by Burdon (1928). Schwabacher *et al.* (1947), showed that the pigment produced in its colonies on blood agar is not melanin but haematin, and proposed that the name *nigrescens* replace the misconceived *melaninogenicum*, a change which awaits but obviously merits official adoption. The organism is extremely common, and would be more often recognized if anaerobic cultures on blood agar were incubated longer. The pigment, which is derived from haemoglobin, cannot be formed until haemolysis has occurred, and is not often seen well in less than five days. The colonies are then of a very deep sepia or actually black colour, with glistening surface, and the medium underlying an area of profuse growth is decolorized. These remarkable colonies, usually mixed with those of other bacteria, on a clear and almost colourless medium shading off into red where growth is less profuse or absent, afford one of the most brilliant pictures in all bacteriology, but its aesthetic merits are much diminished by an abominable odour. The 22 strains examined were isolated from cases with gingivitis and other oral lesions, from sputum, and from several cases of uterine sepsis.

Sensitivity Tests

Antibiotic solution and horse blood freshly lysed with saponin, each in a volume of 0.5 ml., were pipetted into Petri dishes, and 14 ml. of meat extract peptone agar *p*H 7.4, at 47° C., was added and well mixed before setting. Uniform distribution of the blood, which could be seen, gave an assurance that the antibiotic was similarly distributed. Lysed blood was used for two reasons: lysis liberates V factor and, whether or not for this reason, has been found to improve growth; a clear medium is also helpful for inspecting growth and for seeing markings on the under-surface of the dish. This was divided into 12 compartments, and each area so enclosed was inoculated with a different strain of *Bacteroides*, the inoculum being one 1-mm. loopful (loop made of very fine wire) of an undiluted blood broth culture spread over an area about 2 cm. in diameter. The cultures were inspected for presence or absence of growth after two to five days' incubation anaerobically with 5% CO_2 (two days gave adequate growth of *Bacteroides fragilis*; others required longer).

Seven antibiotics were used, doubled dilutions being made from freshly prepared solutions. Oxytetracycline was chosen as representative of the tetracyclines, being preferred to chlortetracycline for its greater stability.

Results

The results are stated in Table II. End-points were almost invariably sharp. In some tests higher concentrations of streptomycin were used than those included in this Table: apart from two strains of *Bacteroides melaninogenicum* resistant to 512 μg./ml., all strains of all species were inhibited by this concentration or one between it and 16 μg./ml. These degrees of sensitivity seem to have no practical consequence.

TABLE II.—*Numbers of Strains of Four Species of* Bacteroides *Inhibited by Different Concentrations of Seven Antibiotics*

Species of *Bacteroides* and Antibiotics	Minimum Inhibitory Concentration (μg. per ml.)												Resistant*	
	0.007	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16		
***Fragilis*:**														
Penicillin												10	13	>16
Streptomycin ...													23	>16
Chloramphenicol ...										3	19	1		
Oxytetracycline ...							12	2	9					
Erythromycin ...									3	5			15	> 4
Polymyxin ...													23	>16
Bacitracin													23	>16
***Fusiformis*:**														
Penicillin				2	2	1	1							
Streptomycin ...										2	2		2	>16
Chloramphenicol								3	2	1				
Oxytetracycline ...					4		2							
Erythromycin† ...									1		1		3	> 4
Polymyxin ...				2		1	1	2						
Bacitracin													6	>16
***Melaninogenicum*:**														
Penicillin	2	5	8	7										
Streptomycin ...											2	6	14	>16
Chloramphenicol								5	8	6	3			
Oxytetracycline ...					6	8	6	2						
Erythromycin ...		1	5	6	6	3	1							
Polymyxin ...				2	2	5	2						11	> 0·5
Bacitracin									4	6	8	3	1	>16
***Necrophorus*:**														
Penicillin				3	1									
Streptomycin ...												1	3	>16
Chloramphenicol								2	1	1				
Oxytetracycline ...					1	1	2							
Erythromycin ...										4				
Polymyxin ...				1	1	1	1							
Bacitracin ...													4	>16

* Numbers given are, first, the number of strains, then the concentration to which they were resistant.
† One strain not tested.

Discussion

Although there is a good deal of strain variation in sensitivity, the results afford a fairly clear picture. Three of the four species are fully sensitive to penicillin: this accords with the majority of published results for *Bacteroides necrophorus*, and is in accordance with expectation for *Bacteroides fusiformis* in view of the therapeutic action of penicillin in Vincent's infection. *Bacteroides melaninogenicum* is very highly sensitive: to know this may be of importance in connexion with a form of subcutaneous gangrene spreading from an abdominal operation wound and accompanied by a foul-smelling dark brown discharge, in two cases of which I have found this organism. On the other hand, *Bacteroides fragilis* is much more resistant, and authors who have reported such resistance in unidentified *Bacteroides* organisms may have been dealing with this species. Since this species is so closely associated with the lower bowel, it might be a sound policy to assume that most *Bacteroides* infections arising in this area will be penicillin-resistant.

Streptomycin clearly has no place in treating any of these infections. Oxytetracycline is consistently more active than chloramphenicol, and it is likely that other tetracyclines will behave similarly: chlortetracycline has been used successfully by several authors already quoted. The superiority of oxytetracycline over any other antibiotic in activity against *Bacteroides fragilis* is interesting in view of the remarkable efficacy of this antibiotic in treating peritonitis due to a perforated viscus, although in this connexion action on other bacteria must also be important. Veillon and Zuber (1898) found this organism constantly present in the pus of appendicitis, and although they are rarely identified, such organisms are frequently numerous in the peritoneal exudate due to perforation of any part of the lower bowel.

Of the remaining antibiotics tested, erythromycin is highly active only against *Bacteroides melaninogenicum*, and this is the only species against which bacitracin has any action at all in the concentrations used. Polymyxin is uniformly active against all species except *Bacteroides fragilis*. It seems unlikely that the use of any of these three antibiotics could be specially indicated for these infections.

The mere existence of a *Bacteroides* infection can often be demonstrated or confidently deduced within a short time, but to isolate and identify the organism and test its sensitivity to antibiotics will take at least a week, although some useful information may be obtained by a sensitivity test (cup or disk method) in primary culture. It is thus desirable to have some general policy for the immediate treatment of these infections. The policy suggested by these results is that one of the tetracyclines should be used for infections originating in the lower bowel, and penicillin for all others, unless they are mixed, when the choice will depend partly on the sensitivities of the other bacteria.

Summary

Existing information about the sensitivity of different species of *Bacteroides* to antibiotics is incomplete and contradictory.

Bacteroides fusiformis (6 strains), *necrophorus* (4), *fragilis* (23), and *melaninogenicum* (22) have been tested for sensitivity to seven antibiotics by a falling dilution method over a full range of therapeutically attainable concentrations.

Penicillin equals or exceeds other antibiotics in activity against three of these species: *Bacteroides fragilis* is resistant to penicillin, and most sensitive to oxytetracycline. All species are relatively resistant to streptomycin and moderately sensitive to chloramphenicol.

A therapeutic policy for these infections is proposed, to be applied in the absence or in advance of laboratory data.

Almost all the difficult and laborious work of isolating and maintaining these strains, as well as the sensitivity testing, was carried out by Miss Pamela M. Waterworth, to whom I express my grateful thanks.

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ASPIRIN AND GASTRIC HAEMORRHAGE

BY

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Since the observations of Douthwaite and Lintott (1938) there has been no doubt that aspirin can cause gastric haemorrhage, but most of the information on this topic has been in the form of reports of one case or of a small number of cases—for example, Hurst and Lintott (1939), Crismer (1947), Dumont-Ruyters (1948), Richmond (1950). There had been little published on its general frequency as a cause of haematemesis or melaena serious enough to cause admission to hospital until Muir and Cossar's (1955) observations that about one-third of patients with peptic ulcer, and about one in twenty of a series of control patients, complained of dyspepsia after taking this drug. They suggested that in one in eight cases of haematemesis aspirin had been "at least a contributory cause" of the bleeding.

In every series of cases of haematemesis and melaena there are some which defy diagnosis in spite of every investigation, including exploratory laparotomy and even post-mortem examination. Probably, as Tidy (1950) says, Hurst (1943) overstated the case when he alleged that about half the "undiagnosed" cases might be found to be due to aspirin. Avery Jones (1952) confessed to "a strong clinical impression" that an occasional case is due to aspirin idiosyncrasy. In the course of a recent survey of a series of cases of gastric and duodenal haemorrhage patients were asked about their "aspirin habits."

The object of this inquiry was threefold: (1) To find out the "aspirin habits" of the patients concerned, especially their reasons for taking the drug, their method of taking it, and whether it usually caused any symptoms. (2) To discover whether any cases might reasonably be attributed to the drug alone—that is, in patients with no evidence of any other possible cause of the bleeding. (3) To investigate the circumstances of any such cases, and, by comparison with reported cases, to find any common features which led to the administration of the aspirin, with a view to preventing a recurrence.

The patients were asked about their habits, and whether they had observed any untoward effects. A few have been omitted, mainly those who were too ill to be interrogated or those who were mentally incapable of giving a coherent answer or even of understanding the question. Of the former, it is almost certain that none were cases of aspirin haemorrhage, the lesion

responsible having been established by radiography, operation, or post-mortem examination.

Results of the Inquiry

Habits of Aspirin-taking.—The 170 admissions in the series involved 165 patients. The "aspirin history" was obtained in 151 of these, of whom 34 never took aspirin in any form. Of the remaining 117, 106 were diagnosed as having "proved or probable peptic ulcer." The 117 patients yielded the following data:

Reasons for Taking Aspirin.—About one-third of the patients gave more than one reason. The reasons are analysed as follows: headache (including one case of migraine), 52; for sleeping, 29; colds and "flu" (including two prophylactically), 26; for pain (arthritis, phantom limb, etc.), 17; abdominal pain, 17; as a "tonic," 13; "because my wife takes them," 3; hangover, dental extractions, dysmenorrhoea, menopausal flushes, and feverishness, 1 each.

Method of Taking Aspirin.—This information is available in 115 of the 117 patients: swallowed whole, with a minimum of water, 67; swallowed whole, with a good drink, 25; swallowed whole, with no water, 5; crushed, with a minimum of water, 8; crushed, with a good drink, 10.

Unwanted Effects.—28 patients complained of symptoms after taking aspirin: Dyspepsia, nausea, vomiting, or heartburn, 24; palpitation, 3; swelling of lips, 1; "suffocation" and salivation, 1. The patient complaining of "suffocation" and salivation was one of the 24 who complained of dyspepsia.

There was no correlation between the method of taking the drug and the occurrence of these effects, although one patient found that the taking of water with the tablets definitely lessened the dyspepsia which usually occurred afterwards.

Cases of Aspirin Haemorrhage.—In 3 of the 170 cases under investigation there was reasonably good evidence that aspirin could be incriminated as the cause of the haemorrhage. The circumstances in which this had occurred are reviewed in connexion with the other reported cases below.

Circumstances of Aspirin Haemorrhage

The cases fall into three fairly definite groups: (1) Those in which the aspirin was taken for some painful illness entirely independent of the gastro-intestinal tract. (2) Those in which the aspirin was taken because of abdominal pain. (3) The unwitting treatment of a sensitive patient in hospital.

Group 1

Many of these patients complain of low back pain or "sciatica." Some have one or other kind of chronic arthritis, but various acute or chronic painful disorders have been responsible—for example, migraine in Hurst and Lintott's case, and renal colic in Richmond's case. It is the presence of this separate disease which may give the clue to the possibility that aspirin may have been the provocative cause of the bleeding. The following two cases fall into this category.

Case 1.—A farmer's wife aged 56 was admitted to hospital on August 29, 1951. Twelve days before admission she had retired to bed with "lumbago and sciatica." For about a week before admission she had complained of intermittent gnawing abdominal pain. Three days before admission she fainted and immediately afterwards vomited not more than a pint (570 ml.) of dark red blood. She had black stools in the next three days. During the few days before the haematemesis she had been taking 10 gr. (650 mg.) of aspirin when necessary, and 5 gr. (320 mg.) of aspirin in a compound tablet at night. She knew that aspirin usually caused nausea or actual vomiting, and had always avoided it in the past. An hour before the haematemesis, after breakfast, she had taken 5 gr. (320 mg.) of aspirin, crushed in milk; this was followed by epigastric discomfort. On admission she was observed to be an obese woman, with a pulse rate of 100 and blood pressure 190/100. Apart from slight epigastric tenderness there were no other abnormal findings. She made an uneventful recovery without transfusion, and had no more abdominal pain after admission. An *x*-ray examination 12 days after admission showed no abnormality.

Case 2.—A publican's wife aged 65 was admitted to hospital on May 4, 1952, complaining of low back pain, radiating down the left leg, of seven days' duration. She had been in bed for four days. She had been in the habit of taking two tablets each containing 7½ gr. (500 mg.) of aspirin at bedtime if she had a headache; the last occasion was two weeks before admission. This sometimes gave her mild heartburn. In the four days before admission she had been taking codeine compound tablets (*N.F.*), each tablet containing 4 gr. (250 mg.) of aspirin, for the sciatic pain, one four-hourly and two at night, swallowed whole with a minimum of water. The first night she took them (May 1) she woke up feeling ill, with retrosternal pain. She had taken two doses on the day before admission. She was about to take a third dose, when she felt faint and vomited about a pint (570 ml.) of dark red blood. She then passed a loose stool of normal colour. On admission she was found to have a pulse rate of 94 and a blood pressure of 160/115. She was an obese woman with no abdominal tenderness. She made an uneventful recovery without transfusion. *X*-ray examination eleven days after admission, and again seven weeks after admission, showed no abnormality.

Group 2

Abdominal pain is often treated by the patient himself, not only with proprietary preparations of alkalis, but also sometimes with large doses of aspirin. Of the 117 patients in the series whose aspirin habits are known, 17 admitted that they took it for abdominal pain, 5 of them frequently or regularly, all with some relief of pain. One (Case 3) had taken about 600 gr. (39 g.) of aspirin in three weeks for abdominal pain.

Case 3.—A railwayman's wife aged 58 was admitted to hospital on June 16, 1952. For two months she had had pain in the left hypochondrium, with flatulence. Three weeks before admission she had a transient dizziness when passing a stool. She had been pale, and had a poor appetite, for about three or four weeks. She had been taking aspirin at the rate of approximately 40 5-gr. (320-mg.) tablets a week, swallowed whole with a good draught of water or other fluid. During the three weeks before admission she had taken approximately 600 gr. (39 g.) of aspirin. This relieved the epigastric pain at first, but soon began to give her "a burning feeling between the breasts" each time she took it. At this time, too, she began to feel dizzy on occasion while out shopping. Three days before admission she felt faint all day. The day before admission she felt worse, and stayed in bed all day; she vomited several times, at first brown fluid and later bright red blood, and was admitted to hospital early the next morning. On admission she was found to be a very ill, shocked woman, with a pulse rate of 120. Her blood pressure was not recordable. She was given a blood transfusion of 4 pints (2.3 litres), and made an uneventful recovery. *X*-ray examination seven weeks after admission showed no abnormality.

Group 3

In hospital, medicines are rarely refused, and a patient who scrupulously avoids all aspirin preparations may not think it worth mentioning this when offered tablets crushed in a spoon. It is possible that some haematemeses occurring in hospital and otherwise unexplained may in fact have been provoked by aspirin. The following case is that of a patient whose haematemesis was probably caused by aspirin.

Case 4.—A woman aged 49 was admitted to hospital as an emergency on January 13, 1951, with a history of flatulent dyspepsia, especially after fatty foods, for many years. Three years previously she had an attack of colicky abdominal pain lasting 24 hours, during which she fainted and after which she was jaundiced for a week. The dyspepsia and flatulence had grown steadily worse during the past three years. On the day of admission she woke with a slight epigastric pain, which grew worse during the day and became colicky. She vomited once and passed six fluid stools. She was in severe pain on admission, but not jaundiced. There was tenderness over the upper abdomen, especially under the right costal margin. There were no other abnormal findings. On January 15 the haemoglobin was 14 g. per 100 ml., and so it is unlikely that the loose stools two days before admission contained any appreciable quantity of blood. The pain was relieved by morphine and pethidine, but she still had some pain in hospital. On January 19 she had three haematemeses of dark blood with clots, a total loss of approximately 2 pints (1,140 ml.), for which a transfusion was given. *X*-ray examination 41 days after admission revealed a "slight deformity" of the duodenal cap. A cholecystogram was normal.

The patient was readmitted again in April, this time jaundiced, and again in July, when a laparotomy was done. The stomach and duodenum was found to be normal; there were some adhesions around the gall-bladder, and some "biliary mud" was

evacuated, but no true calculi were found. She was well when last seen as an out-patient on November 22, 1951.

During her first admission to hospital she was given 2 codeine compound tablets (*N.F.*) crushed, with a little water, on three successive days after admission, without knowing that she was being given aspirin. In the past all aspirin preparations, including codeine compound tablets and also the "soluble" brands of the drug, had made her sick within a few hours, even when taken crushed and with a cupful of water. She vomited several times in the first few days in hospital, but not after the haematemesis.

In view of the equivocal findings of the opaque meal, it is suggested that there is strong presumptive evidence that the bleeding in this case was caused by the administration of aspirin.

Discussion

These observations were made in the course of a survey of the underlying lesions of gastric and duodenal haemorrhage. This was not primarily concerned with the role of aspirin in causing exacerbations of symptoms, or haemorrhage, in patients with peptic ulcer. Muir and Cossar (1955) show that patients with peptic ulcer have a much higher incidence of intolerance to aspirin than the rest of the population, and this is confirmed. Some of the undiagnosed cases in the "acute lesion group" had taken aspirin in the 24 hours before admission, but only those cases are reported in which the connexion appears to be unequivocal.

Aspirin is so valuable a drug, and so ubiquitously used, that any toxic effects are likely to have an economic significance, as well as causing distress to patients individually. Gastric haemorrhage is undoubtedly one of the most serious of its toxic effects, and an inquiry should always be made about it in any case of gastro-intestinal bleeding, because it is so frequently self-administered and so easily obtained. The doses taken may be massive—for example, Neale (1936) has recorded a case in which the patient took 200 gr. (13 g.) in 36 hours, for the pain of a tuberculous hip-joint.

However, only a small number of people have an intolerance to the drug serious enough to warrant complete abstention from it in any form. Various preparations have been tried, many of which are far less apt to cause trouble than the simple compound. These include calcium aspirin (Thompson and Dragstedt, 1933), buffered aspirin (Tebrock, 1951), and enteric-coated aspirin (Talkov *et al.*, 1950). Finally, there are a few people who are liable to develop really serious allergic reactions with aspirin, and they should be careful, especially when under medical care, to avoid it —no easy task when so many tablets and mixtures contain it. Such people are rare, and it would be a pity if the advantages of so valuable an analgesic were to be denied unnecessarily to those who would benefit from it.

Summary

Of 165 patients admitted to hospital with haematemesis and melaena 151 were studied with regard to the taking of aspirin; 34 never took aspirin; of the other 117, 28 complained of some undesirable side-effects, of which 24 were epigastric pain, nausea, vomiting, or heartburn. There was no correlation between the method of taking it and the occurrence of these symptoms. Among 170 episodes of haematemesis or melaena there were three which gave reasonably good evidence for supposing that the aspirin had caused the bleeding, in the absence of any other gastric lesion.

These three cases, together with a fourth case not in the series of 170, and others from the literature, are analysed. The analysis shows that this bleeding occurs in one of three circumstances: (1) aspirin taken for some painful disorder independent of the gastro-intestinal tract; (2) self-medication for abdominal pain; or (3) the unwitting treatment of a sensitive patient in hospital.

As serious intolerance occurs in only a small number of patients, and as aspirin is so valuable an analgesic, patients should not be forbidden it unless this is really necessary, but, if they are, they should be warned to be suspicious of any analgesic offered to them, for many of these contain aspirin. Those who have minor gastro-intestinal symptoms from the drug should take a preparation such as calcium aspirin or enteric-coated tablets if these are available.

I am indebted to the consultant staff of Addenbrooke's Hospital for allowing access to their patients, and particularly to Dr. Laurence Martin for his interest in the subject. I am grateful to Mr. S. J. Hopkins, pharmacist to the United Cambridge Hospitals, for various criticisms.

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COMBINED ANTIHAEMOPHILIC GLOBULIN AND CHRISTMAS FACTOR DEFICIENCY IN HAEMOPHILIA

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In the last year haemophilia has been separated into different types—namely, the well-defined classical haemophilia A (antihaemophilic globulin deficiency) and Christmas disease or haemophilia B (Christmas factor deficiency, factor IX deficiency, plasma thromboplastin component deficiency). Another haemorrhagic diathesis resembling haemophilia but apparently dominant in character has been described as plasma thromboplastin antecedent deficiency (P.T.A. deficiency or haemophilia C).

Since the different types of haemophilia have been discovered only one case of mixed haemophilia has been described (Soulier and Larrieu, 1953). This condition is extremely rare.

The patient described in this paper is one of 43 patients clinically thought to have haemophilia, of which 4 had haemophilia B and 39 had haemophilia A. Our purpose is to study the haemorrhagic diathesis occurring in one family in which five males of the last generation were affected. Two of them bled to death in childhood. The remaining three were fully investigated. The point of particular interest in this family is that the type of haemophilia is not the same in all the affected members.

Methods

Platelets were counted by the method of Van Goidsenhoven (1926). The clotting-time was determined by the Lee and White (1913) method, the bleeding-time

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by Duke's (1910) technique, the one-stage prothrombin time as described by Biggs and Macfarlane (1953), and the heparin-tolerance test and prothrombin consumption test by minor modifications of Soulier's techniques (Soulier, 1948 ; Soulier and Le Bolloch, 1950 ; Verstraete *et al.*, 1954). The thromboplastin generation test has been performed according to the technique of Biggs and Douglas (1953). The activity of Christmas factor in serum was studied in controlling the correcting power of this serum on the serum of a patient with Christmas disease.

Case 1

A man aged 22 had suffered from a haemorrhagic diathesis since childhood. This was characterized by recurrent haemarthrosis without important ankylosis, large haemorrhages into muscles, subcutaneous ecchymoses after minimal trauma, and recurrent epistaxis. The latter became less frequent after the age of 18. In 1946 an operation for acute appendicitis necessitated repeated blood transfusions. These did not stop the bleeding; it did not cease until the operation wound was completely healed. In 1948 a large cephalohaematoma resulted from a blow on the head.

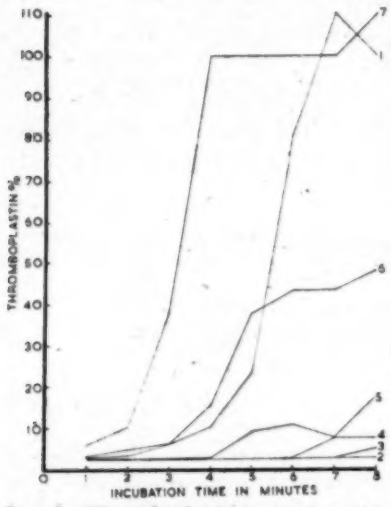


FIG. 1.—Thromboplastin generation test. Curve 1: with normal reagents—that is, normal platelet suspension, a antihaemophilic globulin, factor V, and serum. Curve 2: with same reagents from Case 1. With same reagents from Case 1 *except* normal platelets (curve 3), normal factor V preparation (curve 4), normal antihaemophilic globulin preparation (curve 5), normal serum (curve 6). Curve 7 represents the thromboplastin formed with patient's platelets and factor V and normal antihaemophilic globulin and serum.

In 1954 he suddenly had a severe haematuria lasting between five and seven days. This had never occurred before. Two male first cousins, children of two different maternal aunts, suffered from a haemorrhagic diathesis. Two other first cousins bled to death in the first years of their life.

The platelet count (268,000 per c.mm.), capillary fragility, bleeding-time, clot retraction and prothrombin one-stage test were normal. The clotting-time was determined on several occasions, and was always at the upper limit of normal (8 to 12 minutes), as was the clotting-time of recalcified plasma (190 seconds). The heparin-tolerance test was diminished, and corresponded with the slightly prolonged clotting-time (25 minutes, compared with a normal of 13 minutes). The serum consumption time after six hours was 34 seconds (normal, more than 40 seconds). These last two results, occurring with a normal one-stage prothrombin time, suggested that the coagulation defect occurred during the first phase of coagulation—that is, the formation of plasma thromboplastin.

The separate factors concerned in the first phase of blood coagulation were tested by the thromboplastin generation test of Biggs and Douglas (1953). The reagents required for this test (platelets, factor V, antihaemophilic globulin, and serum) were prepared from both normal and the patient's blood. The results of this test are shown in Fig. 1. Platelets, alumina plasma, and serum prepared from the patient's blood showed deficient formation of active thromboplastin. The platelets and factor V had normal activity when tested in a normal system. Antihaemophilic globulin and serum both showed deficient thromboplastin formation in a similar system. Antihaemophilic globulin from the patient's plasma was prepared by precipitation by 33% $(NH_4)_2SO_4$ saturation at 0° C. This protein fraction from the patient's plasma reacted in the same way as similar preparations from haemophilic plasma.

Normal serum contains several factors necessary for blood coagulation—namely, factor VII, Christmas factor (factor IX), and possibly the plasma thromboplastin antecedent (Rosenthal *et al.*, 1953). According to Rosenthal *et al.* (1953) the factor lacking in plasma antecedent deficiency is present in normal serum and is not absorbed by $BaSO_4$. The addition of $BaSO_4$-treated normal serum did not improve the formation of thromboplastin by the patient's platelets, alumina plasma, and serum. His serum did not correct the abnormal thromboplastin formation of serum from a patient treated with dicoumarin anticoagulants. In the latter, the abnormal thromboplastin formation is caused in the first place more by the Christmas factor deficiency than by factor VII deficiency (Verstraete, 1955 ; Verstraete and Vandenbroucke, 1955a). The last two experiments therefore indicate a deficiency of Christmas factor in the patient's serum. The presence of an inhibitor was excluded by determining the clotting-time of mixtures of recalcified patient's and normal plasma. The presence of 1/10 normal plasma corrected the abnormal clotting-time of recalcified plasma (see Table). The addition of Cohn's fraction 1 partly corrected the defect. This latter fraction contains potent antihaemophilic globulin, but no Christmas factor activity. The patient's plasma did not correct the defect in haemophilia A or haemophilia B plasma.

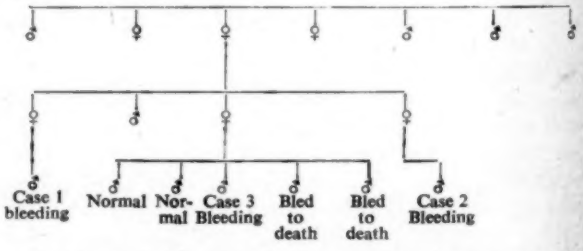
Recalcification Times (in minutes and seconds) of Mixtures of Platelet-free Plasma of Case 1 and (A) Normal Platelet-free Plasma, (B) Fraction 1 Cohn, (C) Plasma of Haemophilia A, (D) Plasma of a Patient with Christmas Disease

Mixture		Recalcification Time			
Plasma of Case 1	$+CaCl_2$ M/40 at 37° C.	A Normal Plasma	B Fraction 1 Cohn	C Plasma Haemoph. A	D Plasma Haemoph. B
0·1 ml.	0	5′ 19	5′ 30	5′ 44	5′ 30
0·09 ,,	0·01 ml.	2′ 34	2′ 53	5′ 41	—
0·075 ,,	0·025 ,,	1′ 52	3′ 26	5′ 12	—
0·050 ,,	0·050 ,,	1′ 40	3′ 24	8′ 13	6′ 12
0·025 ,,	0·075 ,,	2′ 23	1′ 51	7′ 57	—
0·01 ,,	0·09 ,,	1′ 28	2′ 05	10′ 02	—
0	0·1 ,,	1′ 50	—	12′	13′

All these results point to a combined deficiency of both antihaemophilic globulin and Christmas factor.

Investigation on the Haemostatic Defect of Two Other Bleeders in the Same Family

The mother of the patient had two sisters who each had an affected son still alive. As detailed in the family tree, two first cousins of Case 1 bled to death.



All the members of the last generation were examined. Two of the five still alive were normal. No members of the two previous generations were known to be bleeders.

Case 2.—A garage proprietor aged 45 had suffered from the age of 3 from recurrent haemarthrosis and haemorrhages into muscles. In the last 20 years the only manifestations of this tendency to bleed had followed tooth extractions. The clotting-time was at the upper limit of normal (10 minutes); the clotting-time of recalcified plasma (3 minutes, 36 seconds) and the heparin-tolerance test (16 minutes—normal 10 minutes) were prolonged. All other tests were

within normal limits (platelet count, bleeding-time, Rumpel–Leede test). The thromboplastin generation test, using platelets, alumina plasma, and serum prepared from the patient's blood, was abnormal (Fig. 2). Normal serum did not produce normal generation. Normal antihaemophilic globulin and haemophilic B antihaemophilic globulin produced normal generation when substituted for the patient's antihaemophilic globulin. Therefore antihaemophilic globulin was the only abnormal factor.

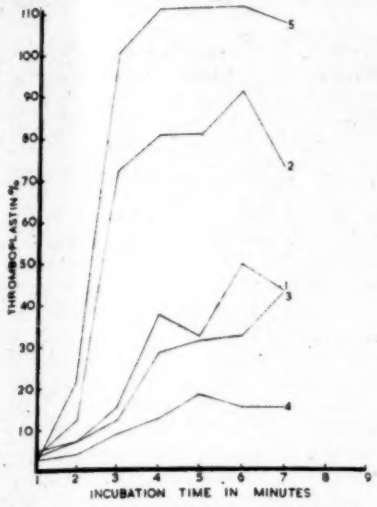


FIG. 2.—Thromboplastin generation performed with the reagents of Case 2 (platelets, factor V, antihaemophilic globulin, and serum) (curve 1); with the same reagents except antihaemophilic globulin prepared from the plasma of a case of Christmas disease (curve 2); with the same reagents except normal serum (curve 3). Curve 4 represents the thromboplastin generation with platelets, factor V, antihaemophilic globulin, and serum of Case 3; and curve 5 with normal reagents (platelets, factor V, antihaemophilic globulin) and serum of Case 3.

Case 3.—A male clerk aged 32. This man's bleeding diathesis was first noticed at the age of 2, when he required blood transfusions for excessive haemorrhage. Further severe bleeding followed repair of an inguinal hernia, and transfusion was necessary. Repeated haemarthroses occurred into the elbow-joints. The clotting-time was 16 minutes (venous blood). Recalcified plasma clotted in 6 minutes 48 seconds; the heparin-tolerance test was also pathological (24 minutes, against a normal of 10 minutes). The serum consumption time four hours after clotting was 34 seconds; it was 51 seconds 24 hours after clotting. Thromboplastin formation was deficient when reagents made from the patient's blood were used. As in Case 2 the defect lay in the antihaemophilic globulin fraction and not in the serum (Fig. 2).

Therefore these relatives of Case 1 had a deficiency of antihaemophilic globulin (haemophilia A) as the only abnormality.

Discussion

If the frequency of haemophilia A is 1 in 10,000 and haemophilia B (Christmas disease) 1 in 100,000, then a combined defect must be extremely rare. However, it must be taken into consideration that if one chromosome anomaly exists a second anomaly may not be so uncommon. For instance, the incidence of colour blindness in haemophiliacs is statistically greater than normal. Both defects are linked to the X-chromosome.

A case of combined antihaemophilic globulin and proaccelerin (factor V) has been described (Koller, 1954). The combination of antihaemophilic globulin deficiency and a prolonged bleeding-time has been reported in the son and two daughters of one family (Verstraete and Vandenbroucke, 1955b). Larrieu and Soulier (1953), Alexander and Goldstein (1953), Quick and Hussey (1953), and van Creveld and Jordan (1954) have published single cases showing a similar combination.

Another interesting feature of Case 1 was the finding of typical haemophilia A in two male first cousins. So far no family has been found in which both types of haemophilia have occurred as separate or combined defects.

Koller (1954) has, however, described the finding of haemophilia A in one patient and haemophilia B in another patient whose relationship was eventually traced in sixteenth-century records.

In the present family there are two cases of haemophilia A. The bleeding tendency is milder and the antihaemophilic globulin level higher in Case 2 than in Case 3. This statement can be made in regard to the clinical history of both patients. Case 3 is still bleeding frequently and has been transfused several times. Case 2 had had haemarthrosis in childhood, but has not bled seriously in the last 25 years. He has never been transfused. The results of the thromboplastin generation test and other investigations also suggest a marked difference in antihaemophilic globulin level.

Quick and Hussey (1952) have stated that the type and severity of haemophilia should be identical in the one family. The above findings do not agree with this concept. The possibility that a similar A+B deficiency might occur as a transient event in some families cannot be excluded.

It is clear that the blood of a haemophilia A and that of a haemophilia B case would partially correct the coagulation defect where both clotting factors (antihaemophilic globulin and Christmas factor) are deficient. If these latter deficiencies were mild, either blood might render the less sensitive clotting-time normal, and so a combined defect might be missed.

The presence of a circulating anticoagulant must be carefully excluded. If inhibitors are present in the serum they must be present in a higher concentration in the plasma or whole blood, as the anticoagulant is partially neutralized by the process of coagulation. No such inhibitor was demonstrable in the plasma or whole blood of Case 1.

The finding of a combined defect of haemophilia A+B is of considerable interest in relation to the discovery of plasma thromboplastin antecedent by Rosenthal *et al.* (1953). Theoretically, it is possible that they are identical defects, but unfortunately we have so far been unable to compare a case of plasma thromboplastin antecedent deficiency with Case 1.

Summary

A routine investigation of a man who had had classical haemophilia since childhood revealed a defect in both antihaemophilic globulin and Christmas factor (haemophilia A+B).

The defect in the patients' serum was proved not to be a circulating anticoagulant.

Two male first cousins were found to have a pure deficiency of antihaemophilic globulin: in one the defect was mild, in the other severe.

The theoretical possibility of a combined A+B deficiency is discussed.

The possibility of plasma thromboplastin antecedent deficiency and haemophilia A+B being identical defects is considered.

We are indebted to Dr. Rosemary Biggs for reading through and advising in the preparation of this paper, and to Dr. A. A. Sharp for his help in its translation.

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SIMULATION OF CANCER BY OIL GRANULOMAS OF THERAPEUTIC ORIGIN

BY

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This is the record of six patients, each of whom presented a tumour-like oil granuloma* which was mistaken for cancer. In every case the lesion had resulted from the introduction of some oily substance into the tissues during treatment of an earlier disease. In three of the cases the possible diagnostic significance of the history of this treatment was not appreciated until after microscopy had shown the real nature of the granuloma; in the other three cases not even the history of the previous illness had been elicited. Four of the patients were subjected to unnecessarily radical treatment because of the incorrect clinical diagnosis of cancer. Two patients were less unfortunate, for histological examination while the operation was in progress showed that the lesion was not neoplastic; the surgeon was therefore able to deal with it by local excision instead of having to carry out the radical procedure for which the patient had been prepared.

These six cases have been chosen from 14 similar examples which I have seen during the last ten years. Most of the cases were referred to me by colleagues—surgeons and pathologists—whom I am glad to thank for notes of patients' histories and for specimens. The cases are from different parts of Britain and from abroad; they do not represent the material of any particular centres.

Case 1

Anal oleogranuloma following injections for haemorrhoids: abdomino-perineal excision of rectum.

A middle-aged business man found difficulty in passing faeces while on a fortnight's holiday. It seemed to him as if the faeces, which had become harder than usual, were held up by failure of the anal passage to open sufficiently. Soon after his return home his motions regained their usual consistency and the symptom disappeared; it did not recur. He mentioned his experience to a doctor soon afterwards, and examination showed a hard, rather nodular constriction of the upper part of the anal canal. The constriction was presumed to be an annular carcinoma, and abdomino-perineal excision of the rectum and anus was performed without preliminary biopsy. Histological examination of the specimen showed that the lesion was a sclerotic oleogranuloma; there was no evidence of neoplasia. It was then learnt that haemorrhoids had been treated by about 20 injections of phenol in almond oil during the three years before excision of the rectum.

Case 2

Ischio-rectal oleogranuloma after packing of abscess cavity with paraffinized gauze: abdomino-perineal excision of rectum.

A young man developed an acute abscess in the left ischio-rectal fossa. The abscess was incised, and its cavity was packed with gauze tape; the gauze had been smeared with yellow soft paraffin in order to make its withdrawal easier. During the following week the packing was extracted, a few inches at a time, until by the eighth day its removal was complete. A month later there was still a small discharging sinus at the site of the incision, and a firm, painless mass in the left ischio-rectal region was felt through the wall of the rectum. The mass was presumed to be a carcinoma which had broken into the ischio-rectal fossa from a clinically inapparent primary growth in the rectum. The fossa was explored surgically and the findings were thought to confirm this diagnosis; abdomino-perineal excision of the rectum and ischio-rectal tissues was performed. Microscopy showed that the ischio-rectal mass was a typical oleogranuloma; the rectum was normal. The patient became increasingly depressed by having a permanent colostomy and by the unrelieved fear that the operation might not have cured the "cancer." He was sent abroad for a rest, and died there, a few months later, from an accidental overdose of sleeping draught. No evidence of malignant disease was found at necropsy.

Case 3†

Oleogranuloma of breast following packing of abscess cavity with medicated paraffin paste: radical mastectomy.

A young woman accidentally pierced the skin of the lower outer quadrant of her right breast with a needle which had just been used for aspirating pus from a patient's subperiosteal abscess. She developed an acute breast abscess, from which 10 ml. of pus was evacuated through a stab incision, 0.5 cm. long. The abscess cavity was filled with a paste of bismuth, iodoform, and liquid paraffin; a firm, occlusive dressing was applied. No other treatment was given. *Staphylococcus aureus* was isolated from the pus. After a week, when the dressing was removed, the incision had healed over; the underlying tissues were indurated.

Two months later a slightly tender nodular mass, about 2 cm. in diameter, was found at the site of the abscess; it was fixed to the skin and to the pectoral muscle. The mass slowly enlarged; within another month *peau d'orange* and dimpling had appeared over it, and a group of lymph nodes had become palpable under the anterior axillary fold: the nodes were neither painful nor tender. The condition was thought to be a chronic staphylococcal granuloma; attempts to aspirate it were unsuccessful, and a wedge resection of the affected part of the breast was carried out. The mass was bisected by the surgeon immediately after excision: it was solid and hard, and speckled with small yellow spots from which thick cream-like material oozed when the tissue was squeezed; scirrhous comedo cancer was diagnosed macroscopically, and radical mastectomy was performed without further ado. Microscopical examination showed that the condition was a typical sclerosing oleogranuloma, with focal oleogranulomatous lymphangitis and lymphadenitis. There was no evidence of neoplastic disease. The creamy material was shown to contain liquid paraffin and bismuth.

Case 4

Scrotal oleogranuloma following injection of a hydrocele sac: bilateral orchidectomy.

A young man was discomforted by the presence of a varicocele and a small hydrocele of the tunica vaginalis,

*"Oil granuloma" ("oleogranuloma") should be distinguished from "lipogranuloma." Lipogranuloma results from some alteration in the patient's body fat—for example, in traumatic fat necrosis—whereas the granulomatogenic material in oleogranuloma is an oily substance foreign to the patient's tissues.

"Oil" is used in this paper as a name for a range of substances wider than is understood in the strict chemical use of the word, and including true oils, liquid and solid paraffins, and waxes. As the reaction of the tissues is essentially the same whether the granulomatogenic "oil" is liquid or solid, granulomas due to the presence of the solid paraffins and waxes are included here under the term oil granuloma or oleogranuloma; the word "paraffinoma" is avoided.

†This case is recorded at the request of the patient and of her husband, who performed the mastectomy.

both on the left side. The varicocele was successfully treated by three watery injections of sodium morrhuate. The hydrocele increased in size more rapidly after the varicocele had been treated; it was aspirated on several occasions but always rapidly refilled. With the intention of obliterating the sac an injection of 2 ml. of niaoul oil (the essential oil from *Melaleuca viridiflora*), 20% in liquid paraffin, was made through the aspirating needle after each of five fortnightly aspirations. The injections caused an inflammatory reaction, with rapid accumulation of fluid in the sac; the amount of fluid was less after each injection, and after the fifth injection the hydrocele was regarded as cured.

Six months later the patient reported a recurrence of swelling in the scrotum. Examination showed a hard, nodular, painless mass, about 5 cm. in diameter, which occupied most of the left half of the scrotum, apparently replacing the testicle on that side and adherent to the other testicle and to the skin. Small ill-defined nodules were palpable in the lower part of the left spermatic cord. The Wassermann and Kahn reactions were negative. A diagnosis of malignant testicular neoplasm was made; the scrotum was removed with its contents and the spermatic cords, and a bilateral block dissection of the inguinal and femoral lymph nodes was carried out. Macroscopical examination of the specimen showed that the tunica vaginalis on the left side was obliterated, the testicle being covered in front and on both sides by an ill-defined nodular mass of densely fibrous tissue which in places extended into the dermis and across the midline to the opposite tunica vaginalis; nodules of similar tissue were present in the left spermatic cord. Microscopically, the tumour-like tissue was a sclerosing oleogranuloma; the left testis and epididymis and the vas deferens were unaffected by the surrounding granulomatous process and appeared to be histologically normal. The right testis, epididymis, and vas deferens were macroscopically and microscopically normal. The inguinal and femoral lymph nodes showed only the mild non-specific inflammatory changes which are commonly seen in the nodes in this region. No evidence of neoplasia was found in any of the tissues.

Comment

In the four cases which have been described the failure to recognize the granulomatous nature of the tumour-like lesions was disastrous. In none of them was biopsy performed, nor were frozen sections examined during the operation. Whether the therapeutic procedures which resulted in development of the granulomas were well advised would be more competently discussed elsewhere; there is no doubt, however, that in each case the history of the treatment should have suggested the possibility of a granulomatous process, so indicating the special need for histological examination before deciding on the extent of the operation.

In the following cases the oleogranulomatous nature of the lesions was demonstrated histologically during the operation: radical surgery was therefore avoided.

Case 5

Simulation of sarcoma by an intramuscular oleogranuloma following injections of an oily suspension of bismuth.

A woman aged 26 complained of discomfort in the right buttock when riding side-saddle on horseback. It felt to her as if a pebble rolled between the muscles as they moved. Examination showed an irregular mass, apparently within the gluteus maximus. Radiographs were reported upon as showing several irregular shadows in the gluteal musculature on the right side, suggesting the presence of bismuth or similar injected material. The patient said that she had never had any injections: it was therefore thought that the lesion was probably a partly calcified neoplasm. She was told that the likeliest diagnosis was sarcoma and that a hind-quarter amputation might be necessary if this diagnosis was confirmed on exploration of the buttock.

At operation a dense mass of tissue, macroscopically resembling fibrosarcoma, was found in the gluteal musculature. A frozen section showed only oleogranulomatous tissue, and surgical treatment was therefore limited to local removal of the mass by sharp dissection. Exhaustive histological examination of the excised tissue confirmed that the lesion was a sclerosing oleogranuloma; there was no evidence of neoplasia. Bismuth was readily demonstrated in the tissue. The patient eventually admitted that 18 months earlier she had completed treatment for syphilis which had been diagnosed in the secondary stage. This treatment had consisted of alternating courses of oxophenarsine hydrochloride *B.P.* 1953 intravenously and of intramuscular injections of a suspension of bismuth metal in a creocamph base (this base contained camphor, creosote, Japan wax, and palm butter). She had had about 50 intramuscular injections, almost all of them into the right buttock. There was no clinical or serological evidence of syphilis when she was examined during convalescence from the operation; the cerebrospinal fluid was normal.

Case 6

Simulation of sarcoma by an intramuscular pseudotuberculous oleogranuloma following injections of penicillin with beeswax in oil.

A middle-aged woman noticed a painless lump in one thigh while washing. The lump slowly got bigger during the next ten weeks. A surgeon advised admission to hospital for biopsy, followed by amputation if the clinical diagnosis of sarcoma was confirmed. Accordingly, an incision was made over the lesion, which presented as a vascular, yellowish mass, apparently infiltrating the vastus lateralis: a frozen section of a piece of the mass was examined immediately and showed oleogranulomatous foci and conspicuous tubercle-like structures. The rest of the lesion was dissected out from the muscle. Examination of the whole specimen confirmed the findings in the frozen section; most of the tubercle-like structures were characteristic sarcoid lesions, although some had formed around the typical macrophage-lined oil-containing lacunae of an oleogranulomatous lesion. No isotropic or anisotropic foreign bodies were found in ordinary sections or in thick sections (40 micra), and no micro-organisms were seen. The recognition of tuberculoid tissue in the original frozen section led to bacteriological investigation of the freshly excised tissue: no organisms were seen in smears; cultures on blood–agar, Sabouraud's medium, and Löwenstein–Jensen medium were sterile; and no disease developed in four guinea-pigs which were killed at intervals of 6, 12, 20, and 32 weeks after inoculation with a suspension of the granulomatous tissue.

There was no clinical evidence of sarcoidosis; radiographs of the chest and hands were normal, the plasma proteins and the blood picture were normal, and the Mantoux test (old tuberculin, 1:1,000) was positive. The Wassermann and Kahn reactions were negative. The patient then remembered that she had had several injections of penicillin into the affected thigh as treatment for recurrent furunculosis. Her own doctor confirmed that about 18 months before the lump appeared he had given her a course of 15 weekly injections, each of 1 ml. of a commercial preparation of benzylpenicillin with beeswax in arachis oil; he pointed out that the granuloma had developed in the area which he customarily chose for intramuscular injections. The patient is in good health, without evidence of sarcoidosis, three years after the operation.

Oil Granulomas: Some General Comments

The granuloma in each of these cases was caused by an oily foreign substance which had been introduced therapeutically into the tissues. The "oils" concerned were: almond oil, as the vehicle for phenol (Case 1); yellow soft paraffin (Case 2); liquid paraffin as the base of bismuth, iodoform, and paraffin paste (Case 3), and as the diluent

in a preparation of another oil, oil of niaoul (Case 4); a base containing camphor, creosote, Japan wax, and palm butter as the vehicle for bismuth metal (Case 5); and arachis oil and beeswax as the vehicle for penicillin (Case 6). There is no reason to believe that the active ingredients of the preparations used played any part in the causation of the granuloma.

The development of oil granulomas following therapeutic or diagnostic procedures has often been recorded; the relevant literature can readily be traced in reference works, such as the *Quarterly Cumulative Index Medicus*, and needs no detailed reference here. Some of the grossest examples have been complications of oleoperitoneum (Cruickshank, 1941) and oleothorax (Ballantyne *et al.*, 1952). Inhalational oleopneumonia ("lipopneumonia") is a well-known misadventure of this sort, and has been known to simulate cancer (Stonehill and Bodon, 1955). At the other extreme are minute focal oleogranulomas, found incidentally—for example, in sections of surgical specimens; Aaron and Levine (1954) described such a lesion in an endometrial biopsy from a patient after hysterosalpingography using iodized oil. Minor degrees of oleogranulomatous reaction are probably very common in the presence of foreign oils, although serious manifestations are rare.

Comparable granulomas may result from accidental entry of oil into the tissues, particularly if a considerable quantity of mineral oil is injected under pressure—for example, "grease-gun hand" (cf. Moore, 1946). Similarly, paraffin wax, injected into the tissues for cosmetic reasons or to alter the features, has been responsible for the development of oleogranulomas ("paraffinomas") (cf. Andrews, 1954), which in the monstrousness of the resulting disfigurement can equal the ravages of leprosy, lupus, and syphilis. Such distortions have also stricken quasi-impotent psychopathic unfortunates who have injected wax into their own tissues (Best *et al.*, 1953).

Oil granulomas which give clinical manifestations may develop quite rapidly after the oil enters the tissues, or they may first appear months or, rarely, even years later. People differ in the intensity and extent of their reaction to the same oil, and oils differ in their granulomatogenic capacity. The site affected, the nature and the amount of oil present, the physical characteristics of the oil, such as emulsification, the availability of enzymes capable of breaking it down, and changes in the tissues, such as scarring, which may interfere with dispersal of foreign material, are factors which may be important in the pathogenesis of oleogranulomas. Vegetable oils are commonly believed to be unlikely to cause a reaction in the tissues, whereas mineral oils are supposed regularly to do so, and animal oils to occupy an intermediate position. The occasional development of oleogranulomatous lesions in the spinal theca after myelography, in the uterine tubes and pelvic peritoneum after salpingography, and in the lungs after bronchography is evidence of the potential harmfulness of vegetable oils (iodized poppy-seed, arachis, or sesame oil); Case 1, above, is apparently another example of the granulomatogenic activity of a usually bland vegetable oil (almond oil), and similar observations are not very rare.

On the other hand, the absence, in some cases, of any apparent reaction around prosthetic implants of hard paraffin indicates that on occasion even the notoriously granulomatogenic paraffins are not necessarily harmful. However, such prostheses are inserted in the form of already moulded solid masses, whereas the paraffins used for cosmetic purposes or disguise are injected in the fluid state at a temperature above that of the body, solidifying as they cool to body temperature. It is obvious that the latter procedure must offer an opportunity for dispersal of minute droplets of the wax while it is still fluid. Small droplets of liquid oils may be carried to lymph nodes, and focal oleogranulomas may develop along the course of the lymphatics and in the nodes themselves, as in Case 3.

Simulation of Cancer by Granulomas

Foreign-body granulomas rarely mimic cancer; when they do, the consequences of failure to recognize their real nature may be disastrous. Oily and siliceous materials seem likelier than other foreign bodies to be the cause of tumour-mimicking granulomas, yet only a few of the granulomas which even they cause are apt to simulate neoplastic disease. Suture materials, usually silk and cotton, are a rare cause of abdominal granulomas which may be mis-diagnosed as cancers ("Schloffer's tumours": Roska, 1939). In most cases the history and the site of the lesion indicate the possibility of a foreign-body reaction; biopsy is invaluable in avoiding mistaken diagnosis.

Oil granulomas, as occasional simulants of cancer, have been discussed above.

Siliceous granulomas.—Shattock's (1916–17) pseudotuberculoma silicoticum is a classical example of a siliceous granuloma which on occasion may simulate cancer. Typically, this lesion develops as a delayed result of contamination of superficial wounds by siliceous materials such as gravel, sand, and slate. Its fixation to adjacent structures and its progressive enlargement may suggest a neoplasm clinically, particularly if the history of injury is overlooked—indeed, the injury may have been forgotten, for years may elapse before the granuloma takes on active growth. The granulomatous reaction in these lesions, unlike that in pulmonary silicosis, is of sarcoid type; the significance of this sarcoid reaction to siliceous material has been discussed recently by Refvem (1954). Löfgren *et al.* (1955) observed that the onset of growth of siliceous granulomas coincided in a considerable proportion of cases with the development of systemic sarcoidosis; this association was a feature of some of the cases which I have seen, although others have developed no manifestations of any generalized disease during a follow-up period of several years. Neoplasia may also be mimicked by post-operative talc granulomas, as in a case reported by Baar (1953), and in two cases of mine.

I have not come upon any record of an oil granuloma which was associated with a sarcoid tissue-reaction: Case 6, in which a characteristic sarcoid type of granulomatous reaction was associated with typical lacunar oleogranulomatous tissue, is the only instance of such a reaction known to me; the patient has shown no evidence of sarcoidosis. Philpott *et al.* (1954) described a simple sarcoid reaction at the site of injection of "procaine penicillin G suspension," an observation which suggested to them that penicillin itself might occasionally evoke a granulomatous reaction; their conclusions are debatable, and of doubtful relevance to the findings in Case 6.

Infective and Infestive Granulomas.—Infective granulomas such as tuberculomas, gummas, and fungal granulomas, are well known to be able on occasion to simulate neoplasms. Granulomatous masses due to infestation by metazoan parasites may be mistaken clinically for cancer. My father (Symmers, 1903, unpublished observations), working in the laboratory of the Kasr-el-Aini Hospital in Cairo, saw a number of these confusing lesions due to the presence of schistosome ova in unusual situations.

Cancer as a Sequel of Injection of Oil

There does not appear to be any record of cancer developing at the site of an oleogranuloma. The possibility that true neoplasms might result from the presence of foreign oil in the tissues cannot be passed over, in view of the possibility that the oil might contain carcinogenic fractions. Goldenberg (1954) described two cases which he regarded as examples of fibrosarcoma, possibly caused by sesame oil which had been the vehicle for penicillin administered intramuscularly. Oleogranulomatous changes are not mentioned in his account of the cases. While his deductions may be open to argument, his report is a timely reminder of another possible complication of introducing oils into the tissues.

Summary

Six cases in which oil granuloma simulated cancer are described. The oil was introduced into the tissues therapeutically in every case. In four cases biopsy was not undertaken, and the patient underwent unnecessarily radical surgical treatment before the true nature of the lesion was recognized (excision of rectum in two, radical mastectomy in one, and castration in one). Timely histological examination enabled the granulomatous nature of the tumour to be recognized in the other two cases, and radical surgery was avoided.

It is probable that radical treatment would have been avoided in all these cases had the possibility of a granuloma been considered and biopsy performed. A feature common to all the cases was the failure to elicit the history of previous treatment with oily substances, or, when it was known, to recognize its significance.

Other types of tumour-mimicking granulomas are mentioned briefly.

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ANNULAR DETACHMENT OF THE CERVIX

BY

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Annular detachment or spontaneous amputation of the cervix is an uncommon complication of pregnancy. The condition was first described by Scott (1821). De Costa (1933) reviewed 16 cases collected from the literature and added a further one. In a later and more extensive review, Ingraham and Taylor (1947) analysed the clinical findings in 55 patients. Since then Arnott (1949), Uhma (1949), and Manly (1949) have each reported a case, and Jeffcoate and Lister (1952), in a paper postulating the probable mechanism and cause of cervical detachment, record the details of labour in an additional four cases.

The following is the case history of a patient who developed this interesting complication during the course of a prolonged labour.

Case Report

A primigravida aged 26 first attended the antenatal clinic when she was 10 weeks pregnant. On physical examination her general condition was good, the heart, lungs, and abdomen were normal, and on vaginal examination the uterus was in good position and corresponded in size to the period of amenorrhoea. The patient was booked for confinement in hospital and was asked to return to the clinic at regular intervals for antenatal supervision.

Pregnancy progressed satisfactorily until the 38th week, when it was found that the greatest diameter of the foetal head was still above the pelvic brim. As abdominal and vaginal examinations failed to detect an obvious cause for the "free" head, *x*-ray pelvimetry was carried out. The *x*-ray pictures revealed an android pelvis with measurements adequate to accommodate the foetal head, and a favourable outcome for vaginal delivery was predicted.

At the 41st week the patient was admitted to hospital in early labour. On examination her general condition and morale were good, her blood pressure was 125/75 mm. Hg, and albumin and acetone were not present in a specimen of urine. The foetus presented by the vertex with the back to the right and in front, and although the foetal head had settled in the brim, the greatest diameter had not descended into the pelvis. The foetal heart was regular and the membranes were intact.

Nineteen hours after the onset of labour moderately strong uterine contractions were occurring at intervals of three minutes, the foetal head had descended into the pelvis, and the condition of both mother and foetus was good. The patient's urine contained a marked trace of acetone, therefore a pint (570 ml.) of 20% glucose was administered by intravenous drip, following which the patient was given 1/3 gr. (22 mg.) of "omnopon" and 1/150 gr. (0.43 mg.) of scopolamine as a sedative.

Thirty-one hours after the onset of labour the uterine contractions had diminished in strength and frequency, and, because of the poor progress in labour, vaginal examination under general anaesthesia was carried out. This examination showed the cervix to be dilated three fingerbreadths, thin, and well applied to a tense bag of forewaters; the foetal head, which was well flexed, lay at the level of the ischial spines in the right occipito-transverse position. From these findings it was concluded that the cause of delay was not due to cephalo-pelvic disproportion, and it was decided, therefore, to allow labour to continue.

Fifty-two hours after the onset of labour the quality of the uterine contractions had improved. On rectal examination the cervix was almost half-dilated and the bag of forewaters was still intact. Omnopon and scopolamine were repeated by injection, and for the next 12 hours the patient rested well between her contractions. Re-examination at the end of this period showed that further cervical dilatation had not occurred, but in view of the good condition of the mother and foetus it was decided to repeat the sedative and postpone the question of termination by caesarean section until a further 12 hours had elapsed.

Seventy-four hours after the onset of labour the bag of forewaters ruptured spontaneously. The uterine contractions were moderately strong in character and, although the foetal heart was regular and the liquor free from meconium, the maternal pulse had risen to 110 beats a minute. On rectal examination the cervix was half-dilated and had become thick and oedematous. In the light of these findings it was decided to perform caesarean section.

During the preparation of the patient for operation, she suddenly expressed the desire to "bear down" and within a few minutes the foetal head appeared at the vulva. Normal delivery of a live 7-lb. (3.2-kg.) female child was rapidly followed by separation of the placenta and membranes. On cleansing the vulva at the completion of the third stage, a firm, round reddish-purple tumour was noted at the introitus. The tumour consisted of a thick saucer-shaped rim of cervix, the rim measuring approximately 1 in. (2.5 cm.) in thickness and admitting four fingers. The rim was attached to the left side of the uterus by a narrow pedicle in the manner of a circular flap hinged in the region of the left fornix. The pedicle was clamped and ligated and the cervical rim removed.

After delivery the mother and baby made satisfactory progress and were discharged on the tenth day of the puerperium. Six weeks after confinement the mother reported

to the post-natal clinic. On vaginal examination the cervical stump was almost flush with the vaginal fornices and was covered by healthy squamous epithelium.

Two years later the patient again became pregnant. She progressed to term, and after a labour of two hours' duration was delivered normally of a live 8-lb (3.6-kg.) infant.

Discussion

In De Costa's series of 17 patients 88% were primigravidae, 71% had early rupture of the membranes, and the average duration of labour was 63 hours. In the 55 case records analysed by Ingraham and Taylor, 75% of the patients were primigravidae, at least 48% had early rupture of the membranes, and the average length of labour was 48 hours. Cephalo-pelvic disproportion was considered to be present in some 25% of cases in both series; on this high incidence De Costa and Ingraham and Taylor concluded that cervical detachment was the result of disproportion which led to nipping of the cervix between the foetal head and maternal pelvis, with resultant oedema, necrosis, and separation.

In opposing this view, Jeffcoate and Lister point out that in labours complicated by disproportion the foetal head is not applied firmly to the cervix, which tends to hang loosely in the pelvis, nor is the fit of the foetal head in the pelvis accurate enough to produce an annular band of cervical necrosis. Again, the theory will not explain the mechanism in those cases in which disproportion is absent. Jeffcoate and Lister believe the primary factor in annular detachment is true cervical dystocia, which in turn leads to obstructed labour. In support of this concept they draw attention to three findings common to the majority of cases, the importance of which has been overlooked by previous authors. The three features are (1) strong uterine contractions, (2) a foetal head low in the pelvis, and (3) a thin well-effaced cervix with an external os surrounded by a rim of hard fibrous tissue and poorly dilated for the length of time the patient has been in labour. In cervical dystocia characterized by failure of the external os to dilate, the strongly contracting upper uterine segment forces the foetal head firmly on to the cervix, which becomes increasingly stretched to form a thin cap of tissue over the head; with increasing pressure, arrest of circulation and tissue devitalization are inevitable; and finally, by a combination of uterine retraction and downward thrust through the foetus, tearing and annular detachment of the cervical cap result. The level of detachment generally lies at the cervico-vaginal junction, but may vary, depending on the level of the pressure ring exerted by the foetal head and on the degree to which the cervix becomes dilated.

Cervical dystocia, the precursor of detachment, may be primary or secondary; in the former, imperfect dilatation may be due to an inherent defect of the lower cervix such as an excess of fibrous tissue, or to failure of the normal preparatory softening so necessary for easy stretching during labour; in secondary dystocia, scarring and excessive fibrosis in the region of the external os may be the aftermath of previous birth trauma or such gynaecological procedures as extensive and badly executed cauterization or conization.

Prevention of annular detachment obviously lies in the early recognition and treatment of cervical dystocia. The latter is to be suspected in a patient with the triad of signs stressed by Jeffcoate and Lister—namely, strong uterine contractions, a foetal head well down into the pelvis, and failure of the external os to dilate. Vaginal examination will reveal the thin well-applied cervix and the characteristic sharp hard fibrous rim around the external os. Occasionally, as happened in two patients whom I examined recently, the rim of the cervix will suddenly yield before the examining finger, following which full dilatation and delivery are quickly completed; in other cases, two or more small incisions through the rim—that is, cervicotomy—are necessary.

Healing of the torn or incised rim is good, and no trauma was noted on the post-natal examination six weeks later.

Once detachment has occurred, little is required in the way of treatment; as a result of vascular thrombosis secondary to prolonged pressure, bleeding from the cervical stump is slight, and delivery, either spontaneous or with forceps, is accomplished without difficulty.

The chief danger to the mother is from puerperal sepsis, which was responsible for the high maternal mortality (7–11%) in the cases recorded in the literature. A high vaginal swab taken immediately after delivery and the use of the appropriate antibiotic in those cases shown to be infected will largely eliminate this danger.

In the recorded series the stillbirth rate varied from 29 to 40%, a mortality which Jeffcoate and Lister believe to be due to the length of labour rather than to difficulty in delivery.

Summary and Conclusions

A case of annular detachment of the cervix is reported. The condition is the late result of cervical dystocia. The latter should be suspected where there is strong uterine action, a presenting part engaged in the pelvis, and a cervix thin and well applied to the presenting part.

Treatment of cervical dystocia consists of digital dilatation or incision of the fibrous cervical rim. The main risk to the mother is from sepsis and to the foetus from the effects of long labour.

I wish to record my thanks to Mr. H. L. Hardy Greer for his kindly advice and criticism and for permission to publish this case.

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Medical Memoranda

Need for Repeated Microscopical Tests in Gonorrhoea

The following case seems interesting, and certainly points the moral that prevention of transmission of gonorrhoea, with the patient's co-operation, of course, can be assured only by repeated microscopical tests and by treating the presence of pus cells in the genito-urinary discharges with due suspicion.

CASE REPORT

A man aged 22 attended my clinic on August 16, 1954, stating that, following extramarital intercourse six weeks previously, he had had a urethral discharge, which had stopped and recurred without treatment during the past four weeks. Also for the past four days he had had a sore eye and pain and swelling at certain joints.

Examination disclosed a very slight purulent bead of discharge, obtained only by milking, with hazy urine which showed heavy threads in all glasses. He also had tenosynovitis affecting the sheaths of tendons round the left ankle, synovitis of the right knee-joint, which was distended, and iritis of the right eye. The prostate was enlarged and the prostato-vesicular fluid showed scanty pus cells. Neither the urethral discharge nor the prostato-vesicular fluid showed gonococci either in smear or on culture. The Wassermann, Meinicke, and gonococcal complement-fixation reactions were all negative.

In spite of the negative findings in respect of gonococci it was thought that the case was one of gonococcal infection rather than Reiter's disease, and treatment was started on this assumption. Penicillin, 800,000 units, in the form of

"prolopen," was injected on two successive days, and daily irrigations with potassium permanganate, 1/8,000, and prostatic massage twice weekly were instituted. Five days later, on August 27, the iritis had cleared, but the affected joint and tendon sheaths were still affected.

As the urine was still hazy and contained many heavy threads, treatment with "sulphatriad" was started, and by September 3 the urine was clear but with heavy threads, and the prostatic fluid still contained an abnormal number of pus cells. The knee-joint and tendon sheaths had recovered by October 21, but there was still pus in the prostatic fluid, and massage of the prostate was continued until December 17, when it was discontinued because on December 10 the fluid had shown a great reduction in the number of pus cells.

On December 29, however, the patient reattended, stating that the urethral discharge had recurred the previous day, following some heavy drinking about Christmas. Sexual intercourse since early July was firmly denied. In the scanty urethral discharge gonococci were found by smear and culture; again the gonococcal complement-fixation reaction was negative. After one irrigation with mercury oxycyanide the discharge disappeared, as often happens in relapses, but I gave two injections of prolopen, one mega unit each on successive days, and the patient has remained well.

I would interpret the above sequence of events as indicating the presence of a closed or almost closed gonococcal focus in the prostate or a vesicle, the focus not having been properly reached by the first doses of penicillin but having been opened sufficiently by the heavy drinking about Christmas time. If so, there may still be some virtue in the old-fashioned use of alcohol provocation in tests of cure. In any case, it illustrates the danger of dispensing with the microscope in testing for cure and of regarding the persistence of pus cells too lightly.

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Pregnancy and Coarctation of the Aorta

The incidence of coarcation of the aorta is stated by Blackford (1928) to be about 1 in 1,500, with a predominance of males over females of about 3 to 1. Pritchard (1953) believed the incidence in the female population to be somewhere between 1 in 1,000 and 1 in 3,000.

It is not surprising, therefore, that coarctation of the aorta complicating pregnancy occurs infrequently. Morgan Jones (1951) could find only two cases out of 485 pregnant women with organic heart disease, and Mendelson (1940) found three cases in approximately 31,000 consecutive deliveries. Pritchard (1953), who has made an extensive review of the literature—as did Benham (1949)—collected only 79 cases, with an overall mortality of 10%. It is probable, however, that the condition is more common than the literature would suggest (Donald, 1955). Further, cases with a fatal outcome are more likely to be recognized and reported, and may give an exaggerated impression of the gravity of the prognosis.

Novak (1947) urged that as many cases as possible should be reported in order that the prognosis may be more intelligently evaluated and the management put on a well-authenticated basis. To this end the following case is reported.

CASE REPORT

First Pregnancy.—The patient became pregnant for the first time in 1946, when 21 years old. She had always been a healthy person and had led a normal active life. Coarcation of the aorta was first diagnosed during the seventh month of pregnancy. She was described as being a classical case of this condition. Examination showed a fit-looking woman of a rather nervous temperament. The resting blood pressure in the right arm was 230/130 mm. and in the left 220/120 mm. Hg. Both femoral pulses were palpable, but were thought to be diminished in volume. The apex beat was 4 in. (10 cm.) from the midline in the fifth intercostal space. A squeaky apical systolic murmur was present and a loud pulmonary systolic murmur was constant in every position. Arterial pulsations were visible in the region of the vertebral borders of both scapulae. A chest *x*-ray film showed moderate enlargement of the left ventricle, a small aortic knuckle, and multiple rib-notching. The E.C.G. was normal.

The patient remained well throughout the pregnancy and was admitted in labour on May 11, 1946, when 37 weeks pregnant. The first stage lasted 12 hours. Early in the second stage forceps were applied, but were abandoned when unexpected difficulty was met with at the outlet, as it was not thought justifiable to persist in the unfavourable circumstances. A live female infant, in good condition and weighing 6 lb. 10 oz. (3 kg.), was subsequently delivered by a lower-segment caesarean section. The patient's condition throughout the operation was satisfactory, the blood pressure immediately afterwards being 120/80 mm. and two hours later 180/120 mm. Hg.

Convalescence was complicated by a mild puerperal pyrexia, but she was well when discharged three weeks later.

Second Pregnancy.—In January, 1955, the patient stated that she had been well in the intervening period and had been going out to work, in addition to doing her own housework. She was found to be 19 weeks pregnant and the clinical state of the coarctation was unchanged. The blood pressure in the right arm was 250/110 mm. and in the left 240/120 mm. Hg. The E.C.G. now showed sinus tachycardia with left ventricular preponderance and slight ST depression in leads I, AVL, and V_{5-7}. Throughout pregnancy the only abnormality was the raised blood pressure. At no time was albuminuria or oedema present. After one week's rest in bed in hospital an elective lower-segment caesarean section was done at the 39th week. A normal live female infant, in good condition and weighing 7 lb. 10 oz. (3.5 kg.) was delivered. The patient made an uneventful recovery and was discharged well on the 12th post-operative day. Unfortunately, she failed to attend the follow-up clinic six weeks later.

COMMENT

Divergent opinions have been expressed on the management of these cases. Mendelson (1940), taking a pessimistic view of the prognosis, advocated termination in cases seen in the early months of pregnancy and sterilization if pregnancy is far advanced. But Benham (1949) believes, with certain reservations, that the available information does not justify prohibition or interruption of pregnancy.

The majority of authors advocate caesarean section at term in order to avoid the hazards caused by a diminished cardiac reserve and an increase in the hypertension during labour and obstetrical manipulations. Only Pritchard (1953) has advocated vaginal delivery. In his review of the literature he found that the maternal mortality rate was no lower in the group delivered by caesarean section than in the group delivered vaginally, being 7.1% and 6.5% respectively. Tebow *et al.* (1954) have reported three cases successfully treated by surgical correction of the coarctation early in pregnancy, a method first advocated by Miller and Falor (1952).

The case reported above is of interest in that the patient has been delivered by caesarean section on two occasions; the first following "failed forceps" and the second as an elective procedure. At no time was there any sign of cardiac decompensation.

I am grateful to Mr. Kenneth Bowes for permission to publish this case.

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Reviews

HOSPITAL DESIGN

Studies in the Functions and Design of Hospitals. The Report of an Investigation sponsored by the Nuffield Provincial Hospitals Trust and the University of Bristol. (Pp. 192+xx; illustrated. 63s.) London, New York, Toronto: Oxford University Press. 1955.

The intrinsic merit of this report, its system of presentation, and its printing and illustrations are all excellent. Moreover, it has been published at an opportune time in view of the probable resumption of hospital building and extensions after such a long lapse of time. It deals with the following: (1) studies of wards, consultative and treatment facilities for out-patients, and operating theatres; (2) studies in physical environment, including lighting, heating, and ventilation, colour, control of noise, and fire prevention; (3) a study of the demand for hospital services in two hospital groups: one serving a population of about 311,000, and the other a population of about 484,000. This last item is of fundamental importance and indicates two main lessons. The first is that the over-all number of acute general hospital beds required may be fewer than was thought formerly—perhaps only about two beds instead of four or more per 1,000 population. The second is that ward units should be designed for flexibility with the beds grouped together in small more or less self-contained units, so that when necessary they can be reallocated between the sexes, between different age groups, and between different specialties.

The treatment of physical environment in relation to the planning of individual hospitals provides much stimulating matter for hospital architects, doctors, nurses, and lay administrators. For example, the statement that a ward three beds deep can be adequately lit from a window on one side only, if proved correct and accepted, might lead to more economical planning of new hospitals in Britain.

The sections in this volume on wards and operating theatres are of much interest, because, in addition to a most able presentation of the theory of planning such units, they describe in detail an experimental ward unit at Larkfield Hospital, Gourock—now completed and in use—and the experimental ward unit, twin theatres, and central sterile supply department now under construction at Musgrave Park Hospital, Belfast. It is to be hoped that many hospital authorities will make use of the lessons to be drawn from these experimental units as well as from the descriptions of first principles in the report. Thereby the planning of hospitals should become more efficient and more economical in both capital and running costs.

W. G. PATTERSON.

THE PSYCHOSOMATIC APPROACH

A Psychosomatic Approach to Medicine. By Desmond O'Neill, M.D. (Pp. 197+vii. 25s.) London: Pitman Medical Publishing Co. Ltd. 1955.

This little book is concerned with the effects of psychological stress upon the whole patient. It is simply and clearly written in an engaging manner which may well make the subject seem more straightforward than is in fact the case. Indeed, Dr. O'Neill has gone so far in his desire to present psychiatry as a common-sense specialty that he assumes a one-to-one relationship between cause and effect, which, if it were the case, would put psychiatrists out of business. He takes the estimable view, shared with Hippocrates, that the care of the whole patient is the responsibility of the physician, and throughout his presentation makes it evident that he wishes that all family doctors would accept this. Many psychiatrists will take issue with him and with other exponents of the "stress syndrome," particularly upon his seeming neglect of the role of inborn immutable personality traits in the formation of reaction patterns, and also upon his seeming disregard of the less overt environmental causes of neurosis. It all seems so easy, particularly in the many excellent vignettes of cases, which suggest progress to recovery that it would be a delight to achieve. Nevertheless it will mainly be psychiatrists who will criticize the book, and other clinicians—whether family doctors or specialists—will get a refreshing stimulus from it, though they may feel the same nostalgic regret as an amateur gardener looking at the illustrations in a seed catalogue.

Dr. O'Neill, having dealt in a general way with the relationship of the doctor to the patient, gives a statement of the occurrence of neurosis due to stress seen in general practice, and then he deals at length with the effects of psychological stress on bodily function. This he does in an admirable way with clear reference to reliable contemporary work, and throughout an atmosphere of cheerful ease pervades. The book can be recommended as general reading for senior medical students and any clinical practitioner.

DENIS WILLIAMS.

ORTHOPAEDICS FOR STUDENTS

Essentials of Orthopaedics. By Philip Wiles, M.S., F.R.C.S., F.A.C.S. 2nd edition. (Pp. 538+xv; illustrated. 55s.) London: J. and A. Churchill Ltd. 1955.

This textbook on a specialized subject is for undergraduates and practitioners. The author is to be congratulated on this second edition, particularly as he appreciates the extent of orthopaedic progress but has not given way to the temptation of enlarging the volume so that it might cease to fulfil its purpose. The first edition has been a popular book in most medical schools, and the slight changes are consistent with the requirements of the reader. The subjects of spinal curvature, pain in the back, and backache are dealt with simply and with a clarity which will help the student. Examination of limbs and spine is well described. Congenital dislocation of the hip is discussed rather fully, whereas acute suppurative arthritis in infants is described briefly in comparison with the condition in adults, who are less often affected. The injuries and diseases of foot and hand are important to a practitioner, and in this volume he will find precise descriptions with well-chosen illustrations. Throughout the book the clinical features are easy to understand, and nowhere is there too great detail. After the regional conditions have been studied the reader will find general diseases, infections, rarer conditions of bones and joints, and a chapter on tumours of bone. The arrangement of the last mentioned is well planned; each tumour is given an ample description and the radiographs are most suitable. Throughout the volume the indications as to treatment are clearly presented. The value of antibiotics is emphasized, and the author advises the use of penicillin in the first place. His views on the present-day treatment of tuberculosis and of spastic paralysis attract attention.

The student cannot fail to be satisfied with Mr. Wiles's book. It provides him with much useful—in fact essential—knowledge, which he will find well presented, and nearly every illustration will help him. Perhaps the word "idiopathic" can be dispensed with if a third edition is required.

ST. J. D. BUXTON.

HYPOTHALAMIC SYNDROME

Le Syndrome Hypothalamique. By Jean Weill and Mme. J. Bernfeld. Preface by Professeur Rémy Collin. (Pp. 260; 24 figures. 1,600 frs.) Paris: Masson et Cie. 1954.

This book falls into two main sections. After a short account of the anatomy and histology of the hypothalamus, the physiology of the hypothalamic regulation of all the visceral (and also many psychic) functions of the body is reviewed. Thereafter follows a description of the pathological syndromes that result from alteration of these functions—syndromes that are presumed to be due to

disturbances of the hypothalamus. No original clinical work is described, and the review appears to aim at universality rather than critical appraisal.

Even as a comprehensive review it is quite inadequate. The literature considered shows, not unnaturally, a heavy bias towards papers in French; a considerable amount of work published in German and English is quoted, but the capricious way in which minor work is referred to while major contributions are omitted suggests that this literature has not been consulted in the original. There is virtually no reference to work published since 1950. The non-critical nature of the review may be instanced by the section on sleep. The authors state that Hess caused sleep in cats by stimulation of the hypothalamus. Actually Hess's sleep-producing zone is in the thalamus: when he stimulated the posterior hypothalamus he caused arousal, and in some cases stimulation of the anterior hypothalamus caused a condition of atonia. On the other hand, Ranson and his colleagues are reported to have produced sleep by destroying the hypothalamus, when in fact they called it "somnolence" because it differed in many ways from natural sleep. Hess brought about a similar effect and called it "adynamia"; but this is not reported, and the Ranson experiments are said to refute those of Hess. This type of superficial, and hence inaccurate, discussion is found in many other sections. The relation of the hypothalamus to the cerebral cortex is especially misleading, though a large variety of psychiatric disorders are discussed as though they were due to hypothalamic dysfunction. The value of the clinical part of the book is lost as a result of this weakness in discussing the experimental work.

The fact that most sections are summarized in complex diagrams of the effect and counter-effect of all the postulated "centres" and effector organs lends a dangerously seductive air of finality to their calculations. One feels that the authors should reread the strictures of their compatriot Pierre Marie on the *période géométrique* in neurology. The only value one can see in this book is as a source of reference to some little-known French clinical literature of the 1930's and 40's. Many better reviews of the physiology of the hypothalamus are available in English.

DONALD MCDONALD.

A NEW THEORY OF CANCER

The Liver and Cancer: A New Cancer Theory. By Kasper Blond, M.D., F.I.C.S. Foreword by E. Stanley Lee, M.S., F.R.C.S. (Pp. 220+xii. 27s. 6d.) Bristol: John Wright and Sons, Ltd. 1955.

The publication of a book advancing a new theory of cancer will attract attention among the medical profession generally and those engaged in cancer research in particular. It is, however, doubtful if many will be impressed by Blond's new theory. He believes that the basis of all malignant disease is a mutation of somatic tissues caused by chronic liver damage. This damage, the termination of which may be cirrhosis, varies in degree, and up to a certain stage is a reversible process. It results in failure to detoxicate metabolic products derived from the alimentary canal, so that "nutritional toxins" gain access to the circulation. These "nutritional toxins" are responsible for the mutations which lead to the malignant growth.

Nearly all Blond's statistical data are derived from Peller's *Cancer in Man*. By excluding skin cancers on the ground that they can nearly all be cured, and by including uterine cancers because he believes that the uterus may be considered to act as a metabolic organ during pregnancy, he deduces that 98% of all cancers in adults are of alimentary origin. He explains the locations of cancer by his belief that all these degrees of liver damage are accompanied by portal hypertension with inversion of the blood flow. The pressure, however, is not equally distributed throughout the portal tree, but may affect only certain tributaries. Thus, if the gastric flow is affected the stomach becomes congested and "nutritional toxins" become concentrated in this area, resulting in malignancy. This theory is expanded to cover the growth of metastases and the differences in distribution of primary malignancies between children and adults. Blond also claims that this theory explains a variety of other conditions—for example, gastritis, peptic ulcer, ulcerative colitis, and diabetes—all of which he considers as precancerous.

Blond's theory is hypothetical speculation entirely lacking scientific proof, without which it can only be detrimental to the solution of the cancer problem.

J. H. O. EARLE.

COSMETICS

The Principles and Practice of Modern Cosmetics. Volume I —Modern Cosmeticology. By Ralph G. Harry, F.R.I.C. Foreword by P. B. Mumford, M.D., F.R.C.P. 4th edition. (Pp. 786+xxiv; illustrated. 65s.) London: Leonard Hill (Books) Ltd. 1955.

The day has long passed when medical men can afford to neglect the information available in the cosmetic field, for there are few industries which have been more successful throughout the world, and as a result the manufacturers of cosmetics have been able to employ some of the most capable scientists available in commercial chemistry. Consequently these manufacturers were well ahead of us in the use of emulgents. As Dr. P. B. Mumford says in his introduction to this book, "from the data and photographs in this publication, physicians will learn how vehicles can be expected to infiltrate the extremely complicated terrain of the human skin, and the dermatologist can learn to treat disabilities in a manner welcome to the patient because it does not entail grease, stain, irritant or externally obvious drawbacks."

Few of us will want to read this book from cover to cover, but as a work of reference concerning all matters from the formulae and constituents that may be used in the manufacture of toothpaste to the semi-cosmetic preparations that may be used for babies, and from the latest practice and theories concerning permanent waving to the formulae that may be used for making "cosmetic stockings"—that is, "make-up" for legs—it is invaluable. Those who are interested in the advance of applied science to industry will find much of interest. For example, for medical purposes we use emulsions of oils in water or water in oils formed by the action of emulsifying agents. Mr. Harry, in an interesting chapter, discusses the modern practice of forming relatively stable emulsions without the use of these agents by dispersion with acoustic waves. He also discusses the value of adding humectants to emulsions, and such matters as aerosols, the molecular structure of hair, the transmission spectra of certain sun-screens, the difference between the practical and the precise meaning of *p*H, and many matters in physical chemistry which not only are of interest but may have a bearing on some aspects of our work.

Most dermatologists and allergists know Mr. Harry's publications well; this new edition can be recommended to pharmacologists, pharmaceutical chemists, and all who are interested in the mode of action of drugs and the compilation of formularies. Finally, it is of interest to general practitioners who wish to know the correct answers to questions such as, "Would a cold perm hurt my hair, doctor?" or, "What do you think of chlorophyll?"

R. M. B. MACKENNA.

Newcastle Regional Hospital Board has recently produced a booklet on hospital decoration, *The Use of Colour in Hospitals*, prepared by the regional architect, P. H. Knighton, and illustrated by the architectural department. The main aim of the writer is to encourage attractive colour schemes in hospitals both for their therapeutic value to patients and for the benefit of the staffs. He relates the use of colour to the size and shape of rooms and to the age of the building, its outlook and general surroundings. A specimen shade card is included at the end. The illustrations are mainly of a humorous cartoon type to emphasize a point, but they do include several architectural suggestions. The result is a bright and interesting series of notes on the principles of hospital decoration. The booklet is obtainable from the offices of the Board, Walker Gate Hospital, Newcastle-upon-Tyne, 6, price 7s. 6d.

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CONTROL OF WHAT BY WHOM?

Doubts cast by Lord Jowitt on the legality of the Home Secretary's decision to ban the manufacture of heroin has led to postponement of this, at all events for one year. One doubt leads to another, two in particular: the first is on whether the Medical Advisory Committee should have been dragged into this question, and the second on the nature of the question, or questions, put to it. We assumed that the Committee was asked whether there were acceptable alternatives to heroin in the relief of pain—a purely medical question which a committee of 27 medical men of varied experience would surely feel entitled to answer. Lord Jowitt, in his speech in the House of Lords last week, said, however, that he had to infer that the question propounded was: "Do you agree with the Government's resolution to ban heroin?" And in effect the Standing Medical Advisory Committee does seem to have been faced with this difficult conundrum, more political than medical in its implications. According to Lord Mancroft, Joint Parliamentary Under-Secretary of State for the Home Department, "The Standing Medical Advisory Committee considered the United Nations resolution [to prohibit manufacture] and agreed with the Government's proposal to accept it." Lord Woolton, in the same debate last week, confirmed this. The World Health Organization in 1950 asked its member States their views "concerning the necessity for the use or the dispensability of heroin and the reasons therefor." Shortly after this Mr. Aneurin Bevan, then Minister of Health, asked the Medical Advisory Committee, according to Lord Woolton, "to advise him whether, if an international agreement prohibiting the use of heroin was proposed, there was sufficient medical reason why the Government should not support this proposal." Lord Woolton then went on to say this: "Their advice was definite and decisive. They said that it would be justifiable to prohibit the use of heroin in Britain if international agreement should be reached on prohibition of the sale of the drug." It is not clear whether he meant this was the view of the Advisory Committee in 1950; but it appears that it is the view of the Committee in 1955. Lord Jowitt describes the question as a mixed one—partly medical and partly calling for ministerial judgment, "and involving an answer to the question whether our banning of the manufacture of heroin will have the slightest effect on the terrible problem of heroin addiction overseas."

We may reasonably doubt whether the Ministers of Health should have asked their Medical Advisory Committees to advise them on the problem of controlling addiction in other countries. The fact that they did adds considerable force to the criticism made by Lord Webb-Johnson in a letter to *The Times* and repeated in the Lords' debate last week. The Standing Medical Advisory Committee is a subcommittee of the Central Health Services Council set up under Section 2 of the National Health Service Act, 1946, "to advise the Minister upon such general matters relating to the services provided under this Act, or any services provided by local health authorities in their capacity as such authorities, as the Council think fit and upon any questions referred to them by him *relating to those services*." (Our italics.) But the Medical Advisory Committee gave its advice not on the use of heroin as a drug within the British National Health Service, not on the small problem of heroin addiction in Britain, but on an international agreement to advocate the ban on heroin reached by the World Health Organization and the Economic and Social Council of United Nations. It is all rather a sorry muddle, and a somewhat alarming illustration of how under a State-run medical service an arbitrary decision can be reached which affects the practice of medicine in this country, even though such a decision has been based on well-meant intentions to promote international action.

In June of this year the Representative Body passed a resolution: "That this meeting protests against the threatened withdrawal of the most excellent sedative heroin which is of inestimable value in so many conditions, and recommends that it should still be manufactured in this country for use by medical practitioners but not exported." In the House of Commons on December 15 the Home Secretary, Major Lloyd-George, said that the Government would renew licences to manufacture heroin for a further twelve months, but that no licences would be issued to import or export the drug after the end of 1955. So far as export is concerned, then, the Government falls into line with the resolution of the Representative Body. But the medical profession should take note of what the Home Secretary has also said—namely, "I want to make it clear that the only doubt that has arisen is on the question of the legality of prohibiting the manufac-

ture of this drug." He can only mean that this is the only doubt in the mind of the Government, because the correspondence in this *Journal*, in *The Times*, and observations by members of all parties in the House of Lords and the House of Commons show that there are many other doubts. Lord Waverley, who spoke as a former Home Secretary and also from his past experience as the Permanent Head of the Home Office, summed up one powerful doubt thus: "I have always regarded medical practice as a highly individual activity, and I take the simple view that for a Government to deprive an able, responsible, and conscientious medical man of the opportunity of prescribing what he genuinely believes is necessary in the best interests of his patient is indefensible in the absence (I make this qualification) of the most cogent and compelling reasons." As the reason—and probably a mistaken reason—put forward for the ban is to control addiction in other countries, and as such control can be effected by prohibiting export, one wonders what other cogent reasons there are. Is the Government presuming to dictate on therapeutics ? Lord Woolton seems to suggest that the expert should be on top, not on tap. "Or, alternatively," he said, "are we to say that, in spite of the weight of medical opinion, the individual doctor must be allowed to follow his own conscience and his own knowledge in these matters, even though his knowledge may admittedly be inferior to that of the leaders of his profession ? " And then he rubs it in thus: "But when an individual finds himself opposed to the scientific thought of the leaders of his profession then I really cannot admit that, because he has taken such examinations as are necessary to qualify for the practice of medicine, he should be left as a law unto himself." These are the most disquieting observations on medicine ever made by a Government spokesman. There are clearly more things at stake than the properties of heroin and addiction to it. Behind the apparently artless observations of Lord Woolton and the dogmatic attitude of Major Lloyd-George is the threat of therapeutic dictation.

HEALTH AND SOCIAL CHANGE

From the data obtained in the 1911 census the Registrar-General[1] first grouped occupations into social classes. Among the most interesting uses of this classification was an examination of infant mortality, which was shown to be sharply related to social class. The results of the next two decennial censuses confirmed this finding. In the twenty years between 1911 and 1931 the national infant mortality rate fell considerably, and it might have been expected that the class differences would have been diminished. Yet the Registrar-General's analysis[2] showed that, though the separate rates for all the classes fell between 1921 and 1931, the rates for the higher social classes fell about as much as the rates for the lower, so that the social gradient remained virtually unchanged. The problem was also examined by R. M. Titmuss,[3] who used a different grouping of occupations and came to a similar conclusion.

Infant mortality has continued to decline during the past twenty years, and it was therefore of considerable interest to consider once again the relative position of the rates of the different social classes. After the 1951 census W. P. D. Logan[4] used the results of the 1% sample for this purpose, and concluded that "in spite of the tremendous reduction in infant mortality during the past thirty years there has been no narrowing of the difference between the various social classes." He showed that this is also true of the stillbirth and neonatal mortality rates, though the social gradient of these rates is naturally less marked than that of infant mortality. J. N. Morris and J. A. Heady[5] examined the statistics of children of men in eight occupational groups, and reported that the decline in both neonatal and post-neonatal mortality was remarkably uniform between 1911 and 1950 ; the relationship of the rates in the different groups was about the same at the beginning and end of those forty years. Moreover, the constancy of the social gradient was not only characteristic of mortality in infancy ; it was also observed in four causes of death in adults—respiratory tuberculosis, rheumatic heart disease, bronchitis, and cancer of the stomach.

These findings were certainly unexpected. Part of infant mortality is attributable to a group of causes whose incidence has remained almost unchanged during the present century. The proportion of the total deaths due to this group is greatest in the higher social classes, in which it seemed probable that the scope for continued improvement would therefore be restricted. That infant mortality has declined at about the same rate in all classes during the past forty years indicates that the reduction of the incidence of deaths due to preventable causes has been most marked in those families whose rates were lowest at the beginning of the period.

Some possible explanations of these observations were discussed by Morris and Heady,[5] and this week

[1] Registrar-General, *74th Annual Report, 1911*, 1913, H.M.S.O., London.
[2] —— *Decennial Supplement, England and Wales, 1931, Part IIa, Occupational Mortality*, 1938, p. 164, H.M.S.O., London.
[3] Titmuss, R. M., *Birth, Poverty and Wealth*, 1943, London.
[4] Logan, W. P. D., *Brit. J. prev. soc. Med.*, 1954, **8**, 128.
[5] Morris, J. N., and Heady, J. A., *Lancet*, 1955, **1**, 554.

Mr. R. Illsley examines the problem in an article at page 1520 of this *Journal*. From an investigation of primiparae in Aberdeen he has drawn two conclusions which may account at least in part for the consistent difference between the mortality rates in the social classes. The first is that women who marry into a higher social class are on the average superior in physique, intelligence, and general health to those who do not; the second conclusion is that in their obstetric experience, indicated by the incidence of prematurity and obstetric deaths, women who marry into a class higher or lower than their own are apt to be identified with the class they enter rather than with the one they leave. The first of these conclusions would perhaps have been expected, and may to some extent explain the second. It is possible, for example, that it is because in general they are healthy that women who enter a higher social class when they marry have a favourable obstetric experience. This is the explanation suggested by Illsley, and he attempts to show that even when the immediate environmental circumstances are unchanged (for example, when the wife remains in her parents' house) the improved obstetric rates are observed if the marriage has placed the wife in a higher social class. Nevertheless it is hard to believe that the husband's circumstances—indicated by his occupation—have no independent influence on the child's chance of survival, particularly in large families, in which risks of death are greatest.

This reservation does not affect the general interpretation of the Aberdeen data. There is evidently a constant change in the composition of the social classes as a result of marriage, and if this change increases the proportion of healthy women in the higher classes it seems probable that it also has some influence on the obstetric rates. In general it will tend to maintain the difference between the classes. What is perhaps equally important is that there has also been a substantial change in the size of the social classes. Illsley notes that between 1931 and 1951 the number of married women aged 20–24 decreased by 25% in Class V (the poorest) and increased by 80% in Class I, though the crude birth rate was higher in Class V than in Class I. This change may also exaggerate the social gradient in mortality, since women who remain in poor circumstances at a time when conditions are improving may be selected in respect of their general health and their obstetric experience. These two observations—changes in class size and in class composition—must account in part for the constancy of the social gradient in mortality over a period of forty years.

FOOD SUPPLIES AT HOME AND ABROAD

To find out exactly how much food people eat is a monotonous and complex task. Thus consumption may be measured by the amounts of food passing through the hands of wholesale dealers, by the weekly purchases by the housewife, by a detailed record of the food eaten at each meal, or by analysing duplicate meals. Factors such as wastage during cooking or on the plate, meals taken away from home, the contribution made by home-produced food, and even the diversion of food to dogs and cats must not be forgotten. Those who have not been initiated into all the intricacies of practical dietetics may therefore be grateful for the predigested information supplied by official organizations. With trained workers constantly engaged in the same inquiries it is possible to standardize the methods of making surveys of food consumption, and comparisons can therefore be made with reasonable confidence between data collected in different places or at different times.

Information on food consumption in Britain is supplied in annual reports from the National Food Survey Committee of the Ministry of Agriculture, Fisheries, and Food. The series was started some years in arrears, and the report[1] for 1953 has only recently been published. It shows that the reduction of food supplies in 1951–2 caused by economic difficulties was decisively reversed in 1953. As a result the diet tended to revert to a pre-war pattern, with an increased proportion of the expenditure devoted to meat, eggs, butter, sugar, and tea. An increase of 10% in domestic food expenditure during 1953 was almost entirely concentrated on these foods, which all became more plentiful. A disquieting feature in the generally more rosy picture was the low consumption of the more expensive foods by large families. Thus the meat eaten by each member of families with four children was only half the amount eaten by each partner in childless couples; and for fresh vegetables the proportion was even less than half. It seems unlikely that the small consumption of the dearer foods was due to the small appetites of little children, because the amounts of bread, potatoes, and sugar eaten by each member of the large families were only slightly below those found for the childless couples. This low consumption of "protective" foods by the growing children most in need of them had already been noticed in previous years. Presumably meals eaten in school often help to make up for deficiencies at home.

[1] *Domestic Food Consumption and Expenditure, 1953*, 1955, H.M.S.O., London.
[2] *The State of Food and Agriculture, 1955. Review of a Decade and Outlook.* Published by the Food and Agriculture Organization of the United Nations, 1955, Rome.

As a special study, outside its usual routine, the committee undertook a comparison of food consumption in England and Scotland. In spite of decided differences in the type of meals eaten in the two countries, the intakes of food in terms of individual nutrients were found to be almost equal. Comparing food consumed in urban and rural households, the committee found that the 9–12% greater expenditure in towns could be almost exactly balanced against the food which country dwellers produced themselves or obtained free. In the country a little more bread and cheese are eaten than in the towns, and a little less meat and fish.

Turning from Britain to the world at large, we can see from a recent publication[2] of the Food and Agriculture Organization how the production and consumption of food have varied over the last decade. The data which have been marshalled by the present Director-General, Dr. P. V. Cardon, must bring to many a feeling of relief after earlier gloomy prognostications of world-wide starvation. It is true that the total population of the world, excluding the mainland of China, had increased by 10% in the ten years or so before 1946, in spite of the loss of life and disorganization caused by the war. Between 1946 and 1948, moreover, there was a further increase of 13%. But during these periods the supplies of most foods increased even more rapidly. Thus the share of each of the world's inhabitants in wheat, meat, coarse grains, sugar, tea, and citrus fruits seems to have noticeably increased. In contrast the shares of rice, pulses, potatoes, and milk have been very slightly reduced, with the increases in supplies just failing to keep pace with the rising population. Shortages in coffee and cocoa are more pronounced.

Studies of food consumption in different regions have shown substantial increases (in terms of calories) in Western Europe, Turkey, and the Far East since 1947–8. In contrast, slightly less food has been eaten in Oceania and in North America, where abundant supplies might have led to some danger of overeating. But, in spite of the increase in the quantity of food eaten by previously undernourished peoples, there remain very wide differences in the quality of the food available in different countries: thus in Britain we eat, *per caput*, only half the amount of meat consumed in Uruguay, whereas consumption in India is about fifty times less than in Britain. Undoubtedly the inadequacy of the diet in many parts of the world, as has been emphasized by Lord Boyd-Orr, must continue to cause anxiety. For the present, however, it appears that the distribution of food rather than its production is mainly at fault, and that the saturation point in the production of food throughout the world has not yet been approached. Underconsumption, and its threat to the prosperity of the farmer, appears to be a greater immediate worry to the Food and Agriculture Organization than the old bogy of underproduction.

DEATH ON THE TABLE

Operating-room fatalities are now rare in comparison with the era before the second world war. There are three main causes for this happy trend. Firstly, great strides have been made in anaesthetic technique; much smaller amounts of drugs that depress the central nervous system are now given, the desired state of insensibility and relaxation being obtained chiefly with analgesic and relaxant drugs. By these methods anaesthesia can be prolonged almost indefinitely, and yet at the end of an operation the patient regains a cough reflex and consciousness within a few minutes. Secondly, this has allowed surgical technique to change. Instead of hurry, of rushed dissection with poorly controlled blood loss, the surgeon can now be scrupulous in haemostasis and more certain of the anatomy of what he is dissecting. Thirdly, the perfection of transfusion techniques has greatly diminished the severity of "shock" during operations.

Nevertheless tragedies still occur in the operating-theatre, causing much suffering to relatives and despondency to staff. They are not only a cause of grief but are apt to increase among the general public those secret fears which many people have of surgery. In a recent paper from the U.S.A. some seventeen such deaths occurring in a total of 11,705 operations have been reported and analysed.[1] The details need not be recorded here, but there are several important lessons to be learned. The cases can be divided into two main groups—emergencies and those undergoing elective surgery. Patients in the first group are admitted to hospital in a rush, often late at night. It is only too easy in these circumstances for snap decisions to be made without full assessment of the patient's condition. This state of affairs will continue to exist so long as men who have toiled hard all day are expected to retain the keen edge of their judgment the greater part of the night as well. Most patients with acute conditions will be better for waiting a few hours while their fluid balance is restored nearly to normal and any peripheral vascular collapse overcome. The authors of the article also lay great stress on aspiration of vomit as a cause of death, and this has also been found to be the chief factor contributing to anaesthetic mortality in Britain. Gastric stasis occurs frequently in patients who are suffering severe pain, and an essential precaution is to make sure that the stomach is empty before beginning the anaesthetic.

Operations performed as elective procedures carry less risk. An occasional death follows anaesthetic mishaps, and is nearly always preventable. There is no known prophylaxis against sudden cardiac arrest.

[1] Lewis, K. M., and Stanley-Brown, E. G., *Surg. Gynec. Obstet.*, 1955, **100**, 397.

When it occurs it may be treated immediately with cardiac massage performed through an anterior intercostal incision; transdiaphragmatic massage is often inadequate. Poor surgical technique still contributes to operating-theatre mortality. Massive haemorrhage can happen occasionally in the best of hands, but a combination of constant moderate bleeding and rough handling not uncommonly results in a persistent low blood pressure; these patients run the risk of coronary and cerebral thromboses, renal failure, and paralytic ileus. It is a strange paradox that surgical skill itself may contribute indirectly to mortality. An inexperienced surgeon with good hands may be tempted to operate on patients who are too ill to withstand any surgical interference. As elsewhere in medicine, judgment is still all-important, more so now that technique is so good. Finally, some special risks attach to cardiac surgery. Manipulation of the heart frequently results in cardiac arrest or ventricular fibrillation. Anoxia of the ventricular muscle renders it prone to this arrhythmia given the slightest stimulus, especially if hypothermia is being used. Until a sure way has been found of obviating the risk, cardiac surgery will continue to have an appreciable operating-room mortality.

SURVIVAL AFTER LUNG RESECTION FOR BRONCHIAL CARCINOMA

In a recent issue of *Thorax* J. R. Bignall and A. J. Moon[1] have analysed the survival rates of patients treated for carcinoma of the bronchus by lung resection by examining the records of 531 patients operated upon in London, by several surgeons, between 1940 and 1951. All but 2% were followed for at least two years or until death, and in each case the diagnosis was confirmed histologically. The operative mortality (death within two months) was at first 19%, but was 10% during the last two years. After excluding these patients the chance of surviving a year was 63%, two years 47%, three years 39%, and five years 33%. These figures closely correspond to those of other published series from Britain[2] and the United States. Survival rates were notably higher for squamous-celled growths and adenocarcinomas than for undifferentiated lesions. As would be expected, invasion of lymph glands carries a worse prognosis; when glandular metastases were recognized by the surgeon at operation, survival rates were less than half of those considered free. On the other hand, for a lesser number with histologically demonstrated metastases—often not macroscopically visible—survival rates were not substantially worse than those of the whole group. Patients with tumours of the right lung had slightly better survival rates than those with tumours of the left, and tumours of the upper lobes gave better rates than those of the lower. Bignall and Moon suggest that the low survival rate of patients with left lower-lobe neoplasms may be because this lobe drains to right paratracheal lymph glands, not accessible at operation, as well as to left groups, and because spread from lower-lobe tumours is less easily detected than from upper-lobe tumours, which may affect the recurrent laryngeal nerve or supraclavicular glands.

There were fewer than 10% of women among the survivors from operation. The prognosis is a little better for them than for men. Survival in both sexes seems to be independent of age. It varies inversely with a history of symptoms of up to eight months before diagnosis, confirming the general belief that early diagnosis is important. However, a few patients had slowly growing tumours which remained localized. Bignall and Moon found that the extent of the resection makes no significant difference to the chance of survival. On the other hand, during the last two years the operative mortality for lobectomy was nil, for pneumonectomy 13%. This argues in favour of the lesser resection, but the two operations are seldom alternatives, because peripheral tumours are not common and often invade the main bronchi, making pneumonectomy imperative. Sir Russell Brock and Mr. L. L. Whytehead, in an important article recently published,[3] propound strong arguments in favour of routine radical pneumonectomy. To fulfil the accepted principles of cancer surgery with block removal of the associated lymphatic field, intrapericardial ligature of the vessels with resection of an oval of pericardium and extensive dissection of mediastinal glands and tissues are necessary. These surgeons have had much better survival rates than after simple pneumonectomy, 50% of their patients with radical operations being still alive compared with 18%. Lobectomy is sometimes done as a palliative operation, when pneumonectomy would lead to an intolerable loss of respiratory function. Some surgeons practise it as an elective operation in tumours confined to a lobe, especially when glands are not affected. But glandular invasion may not be visible to the surgeon, and lymphatic pathways involve many groups. The publication of further series of results after various types of operation is awaited with interest.

MALE CARRIERS OF GONORRHOEA

Infected women notoriously harbour gonococci without presenting any signs or symptoms, and they have done so from time immemorial. No doubt much the same could be said, though to a less extent, of infected men in the days before sulphonamide and penicillin. Prostatitis and inflammation of Littré's glands were common sequelae of gonorrhoea, and gonococci could lie dormant in urethral follicles and in the glands of the prostate only to reappear under provocation, such as sexual intercourse, and perhaps cause infection of the sexual partner. However, since the introduction of penicillin for the treatment of gonorrhoea it has been an almost universal experience that gonococci disappear within a matter of days or even hours, never to reappear. It is somewhat disconcerting, therefore, to read that two venereologists[1] have recently come across no fewer than seven cases of male carriers of gonococci in a single clinic for venereal diseases. Five of the patients had apparently never been treated for gonor-

[1] Bignall, J. R., and Moon, A. J., *Thorax*, 1955, **10**, 183.
[2] *British Medical Journal*, 1955, **1**, 467.
[3] Brock, R., and Whytehead, C. L., *Brit. J. Surg.*, 1955, **43**, 8.

[1] Bittiner, J. B., and Horne, G. O., *Brit. J. vener. Dis.*, 1955, **31**, 155.

rhoea, one had been treated for venereal disease (presumably with penicillin) four months previously, and one had had signs and symptoms of gonorrhoea six to seven months previously but they had cleared up in three weeks without treatment. It may be assumed, therefore, that six of the seven had not been given penicillin; in any case no conclusive evidence has yet been produced to show that gonococci can become resistant to that antibiotic. What, then, can be the explanation? It seems that these patients were infected with gonococci but that there was no tissue reaction; either the gonococci were (for the time being) saprophytic or the tissues failed to react for some unknown reason. That the gonococci were present in the tissues is clear, and it must be assumed that they lay in the urethral or prostatic glands or elsewhere and only reappeared when some stimulus such as sexual intercourse occurred; that they did so is plain from the fact that sex partners were infected and developed the disease. If these cases were seen in one clinic, presumably others occur in other places; it is somewhat surprising that more have not been reported.

The moral to be drawn is that when a woman is found to be suffering from gonorrhoea her male partner or partners should be examined by an expert with the greatest thoroughness even if they show no signs or symptoms. This examination should include scraping of the urethra and smears and cultures of any discharge, urine sediment, and fluid expressed by prostatic massage; the complement-fixation test for the gonococcus may also be helpful; if it is positive further examination is indicated, but a negative result is of no value. It is well known that several men may have sexual intercourse with the same infected woman and only one or two develop the disease. Can it be that the others do become infected but fail to show signs or symptoms and become carriers? This poses a problem of which we do not know the answer. It does suggest that every male who has exposed himself to possible infection would be wise to seek expert advice.

LOCATING BRAIN TUMOURS WITH RADIOACTIVE ISOTOPES

It is well established that because of the blood–brain barrier a variety of substances present in the blood stream are either excluded from the brain or enter it to a limited extent only. Among these substances are various radioactive isotopes, which have consequently been used to locate intracranial neoplasms, since these trace ions concentrate much more heavily in the tumour than in the surrounding normal brain. Several surgeons[1 2 3] have reported their experience of the method during operations upon the brain. After injecting the isotope intravenously and exposing the brain, the surgeon uses an exploring needle containing a Geiger counter to find the site of maximum radioactivity. The procedure has been found particularly efficient in the presence of vascular and non-cystic tumours. The main lesion is thus located, but the outlying portions of infiltrating tumours are not demarcated; this is unfortunate, because while there are many methods of demonstrating the position of an infiltrating growth, there is none which accurately displays its full extent. The method might, however, be helpful in facilitating the accurate placement of an exploring needle passed through a burr opening for the aspiration of tissue to determine the pathological nature of a brain tumour.

The location of a brain tumour by external counting of radiations through the intact skull would clearly be a much more valuable technique, and its development has been more difficult. The gamma rays emitted by isotopes from a small area within the head scatter widely, and it is difficult to prevent them from entering the detector at an angle, so that the discharges from a small lesion may be dispersed over a wide area of the head. G. L. Brownell and W. H. Sweet[4] have described a technique to overcome these difficulties, and their results are encouraging. Paired scintillation counters are moved over each side of the head simultaneously so that it is automatically scanned. Photons leaving one another in opposite directions and striking the detector on each side are alone recorded, and these "coincidence counts" are charted by a mechanical recorder on a map of the head. The resulting recording is described as a positrocephalogram, and it indicates the site of increased radioactivity in the sagittal plane. The site of the lesion is shown by a different circuit which records the total counts of gamma radiation on the two sides of the head. This is charted automatically and simultaneously with the preceding record; it is known as the asymmetrogammagram. The isotope found most satisfactory is ^{74}As, and to this is added sodium arsenate as carrier.

Brownell and Sweet have achieved considerable accuracy in the location of intracranial neoplasms, and they predict an improvement with redesigned apparatus. Only one out of 33 meningiomata escaped detection—a small and median one. Glioblastoma multiforme was also located accurately in a high proportion of cases, but the site of metastatic tumours was found in less than half of the cases, and in the more slowly growing and relatively avascular gliomata the method also frequently failed. Localization is more accurate with supratentorial lesions, apart from those situated in the midline, and is relatively inefficient with such posterior fossa lesions as acoustic neurinoma, medulloblastoma, and haemangioblastoma. Cerebral abscesses were accurately located in a high proportion of the cases examined. Vascular lesions usually gave negative results—a point of value in differentiating them from neoplasms—but it is of interest that after a convulsive seizure a positive scan can occur in the absence of a focal organic lesion. Brownell and Sweet also found that in a group of patients with Ménière's syndrome, psychoneurosis, and psychosis the scan suggested a focal lesion in 10%.

The obvious advantage of this method of investigation is that it is harmless and painless and can therefore be used when the index of suspicion is low. It is likely to have a place in the routine investigation of intracranial lesions when the apparatus and facilities for using it become available.

[1] Selverstone, B., and White, J. C., *Ann. Surg.*, 1951, **134**, 387.
[2] —— Sweet, W. H., and Robinson, C. V., ibid., 1949, **130**, 643.
[3] Jefferson, G., and Morley, T. P., *British Medical Journal*, 1952, **2**, 575.
[4] Sweet, W. H., and Brownell, G. L., *J. Amer. med. Ass.*, 1955, **157**, 1183.

EMERGENCIES IN GENERAL PRACTICE

SOME COMMON MISHAPS

BY

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A mishap according to the *Shorter Oxford English Dictionary* is "an unlucky accident"; as applied to medicine it is obvious that the "accident" may be intrinsic—for example, a thrombosed pile—or extrinsic—for example, a dog-bite. From the enormous number of mishaps which are encountered it is necessary to choose but a few for description, some because they are indeed common, others because, although less well known, they present some special feature of interest to the practitioner.

Fingers and Toes

Splinters.—The hands and feet, for reasons which are too axiomatic to need iteration, are particularly subject to extrinsic mishaps. A frequent one is the entry of a splinter of wood or metal under the nail, the diagnosis being self-evident. Since splinters always enter from the free margin of the nail they are removed via the same route. A pair of sterile splinter forceps can be gently insinuated, one blade on each side of the splinter, with much less pain than would be anticipated. As with the extraction of teeth, the blades should not be closed until it has been determined that they will get a firm grip of the splinter. Splinters are rarely pathogenically infected, and so, except for general cleaning of the finger with detergents, no dressing is necessary. The pigmented track left behind, due to paint, oil, etc., will gradually disappear with the growth of the nail.

Subungual haematomata occur chiefly on the thumb, from hammer blows, or the great toe, from the falling of heavy objects. They are painful, and if allowed to remain may distort the growth of the nail; they are therefore best evacuated. If the blood extends near the end of the nail a thin knife may be inserted under the nail margin, but if further back a small hole should be made in the nail over the blood. If available a small (⅛-in.—3-mm.) trephine is the best instrument, but usually the operation has to be done with a knife, the nail having previously been softened with a drop of caustic potash, salicylic acid, or even washing soda. In these cases it is as well to bathe the digit in a mild antiseptic solution and to apply a small dressing over the finger-tip.

Mallet-Finger.—Tearing of the insertion of the extensor aponeurosis into the base of a terminal phalanx leads to the condition called mallet-finger. It is produced by sudden overflexion of the terminal joint by force—for example, in catching a cricket ball, or in machinery, etc.—and often a small fragment of the base of the phalanx is torn off with the tendon. Although attempts may be made to suture the tendon, the results are rarely superior to those with treatment by simple splinting for a period of five weeks in a light plaster or plastic splint, with the terminal joint in hyperextension and the intermediate joint flexed. Indeed, in a number of observed cases a good functional result has followed no treatment at all. The middle and ring fingers, being most prominent, are those usually affected.

Impacted Rings

In cases of swelling of the fingers it is sometimes found that rings which cannot be taken off are in danger of causing increased swelling and even gangrene. If the condition is not too far advanced it will usually be possible to remove the ring intact by the following manœuvre. Ordinary dressmaker's tape, ½ in. (13 mm.) wide, is wound tightly, but slowly, along the finger to the level of the ring, starting at the tip, each turn overlapping the previous one by half its width (Fig. 1). The object of this is to reduce the oedema. When the ring is reached a loop of wire—a small hairpin is excellent—is passed under the ring from the proximal side. This may necessitate some bending of the wire to manipulate it between the ring and the swollen finger. The free end of the tape, about 6 in. (15 cm.) long, is then passed through the loop and withdrawn under the ring. The whole is then well rubbed over with a cake of wet soap. Steady pulling on the tape will slowly spiral the ring up the finger. In rare cases where this fails the ring may have to be cut off; this can be done either by the use of a Gigli saw, protecting the underlying skin with a slip of metal foil, or, if available, with one of the special protected circular saws which the instrument makers provide (Fig. 2). An unusual mishap of this nature was shown in a woman who presented with a very swollen, inflamed finger, the signs ceasing abruptly at a deep groove covered by granulation tissue at the base of the digit. When this was exposed surgically, a rubber ring was found embedded in the granulations. On subsequent questioning the patient stated that the only occasion when the ring could possibly have been placed on the finger was some months previously when she had been labelling some plants. It was shortly afterwards that the finger started to swell and this hid the culprit from view.

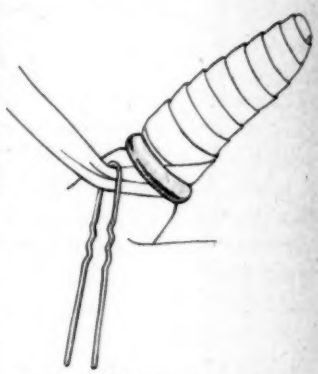

FIG. 1.—Method of removing an impacted ring from a finger, using a spiral of dressmaker's tape.

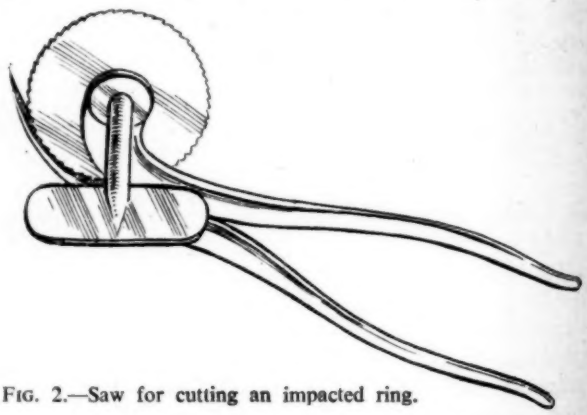

FIG. 2.—Saw for cutting an impacted ring.

Lacerations, Abrasions, Bites, and Stings

Cuts, especially on the fingers, produced by meat or fish knives are liable to infection with the organism of swine erysipelas, *Erysipelothrix rhusiopathiae*. This, the erysipeloid of Rosenbach, is not at all uncommon in butchers, fishmongers, and housewives. After a few days, when the

initial cut is almost healed, a brawny, dusky red swelling spreads over the finger and may extend to its neighbours. Pain is not severe except on movement of the stiffened digit. The condition is self-limiting, lasting six to eight weeks, and does not produce suppuration, but as it yields to large doses of penicillin it is only in missed cases that its full development will in future be seen.

In cuts, lacerations, and abrasions of the face the tattooing of dust, coal, tar, etc., into the skin becomes a matter of cosmetic importance. Great care should be taken therefore to remove the offending material so far as is possible. Large particles can be picked out with forceps, but the commoner small particles are best removed by swabbing or lightly brushing with a suitable detergent; cetrimide is useful in most cases, but for oil and greasy materials trichlorethylene or some other fat-solvent should be employed. If neither of these is available ordinary soap may be substituted, followed by dusting with an antiseptic powder—for example, one containing penicillin or sulphonamide. Closed dressings on the face are best avoided.

It is as well to remember that lesions small enough to be called cuts, as opposed to wounds, do not usually require stitching; after they have been cleaned up the edges are held together by the use of strips of adhesive plaster. Several narrow strips rather than one wide one should be used, as in this way not only is better apposition obtained but drainage of any discharge is allowed for. In the case of more extensive cuts the strips may be applied longitudinally along each side of the wound and themselves stitched without any discomfort to the patient (see Fig. 3).

Bites.—Human bites, not common in this country, are said to be prone to virulent mixed infection and, of course, to the transmission of communicable diseases such as syphilis. Dog-bites, despite their evil reputation, are, at any rate in this country where rabies is practically unknown, much less dangerous. It is a mistake, therefore, to use drastic measures of cauterization; the usual antiseptic treatment is all that is necessary, but if the wound is extensive or contused an injection of 3,000 units of antitetanus serum is a wise precaution.

Stings.—It was customary in the past to treat all insect stings by the application of the "blue-bag"; undoubtedly many stings are acidic in nature and this alkaline treatment was of value. Not all stings are acidic, however, and there is no doubt that a good deal of the reaction is allergic in nature. When such reaction is violent—for example, multiple stings from a swarm of bees—the exhibition of antihistamines, such as diphenhydramine, is more useful than local applications. Capsules of 50 mg. b.d. for two or three days is usually sufficient dosage. In the case of bees, the ovipositor—that is, the "sting"—is often left in the skin with the poison gland attached. It should, of course, be drawn out as quickly as possible.

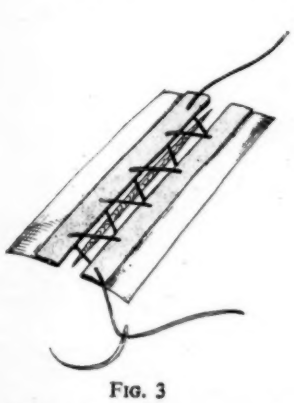

FIG. 3

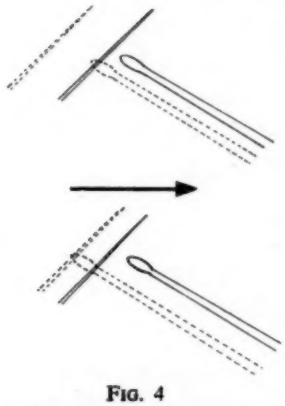

FIG. 4

FIG. 3.—Closure of a wound by stitching strapping. FIG. 4.—Determination of depth of foreign body in relation to a probe by means of parallax. The arrow indicates the direction of movement of the *x*-ray tube, the continuous lines the position of foreign body and probe before movement of the tube, the broken lines their position after movement of the tube. The top figure illustrates the appearance when the foreign body lies deeper than the probe; the lower when the foreign body is superficial to the probe.

Penetrating Foreign Bodies

The hand is the commonest site for the penetration of sharp-pointed bodies such as splinters of glass, metal, wood, thorns, broken drills, etc. In the case of sewing-needles, however, the foot is equally involved owing to the habit, notably in girls, of walking bare-footed in the home. Broken glass is particularly likely to produce an innocent-looking entry wound which may nevertheless have been the portal through which quite serious damage has been done to nerves, tendons, etc., and so it is essential in such cases always to test for movements and sensation. However, the treatment of such lesions is outside the scope of this article; here we are concerned with cases without serious deep lesions. The first thing to be determined is whether any foreign material remains in the wound. Sometimes it is possible to detect this by palpation or by probing the wound, but usually *x*-ray examination is required; if a foreign body is seen, it must be accurately located by further radiographs in other planes. The majority of foreign bodies will give some shadow, especially if soft rays are used: thus metal gives a good shadow; most qualities of commercial glass a recognizable one; wood, luckily, often incorporates traces of paint or preservative which render it visible; but textiles, pure plastics, and latex rubber objects—for example, pure latex or plastic drainage tubing—may fail to give a differential shadow against the body tissues. Ordinary rubber drainage tubing, which contains sulphur, loading, and pigments, is usually opaque enough to be seen.

Small foreign bodies can often be removed by enlarging the wound of entry and withdrawing them with forceps or a sterile crochet-hook, but deeply penetrating needles—and this applies equally to broken hypodermic needles—should be approached with care. If the anatomy of the part allows, the incision should be transverse or oblique to the lie of the fragment as seen on the radiograph, as in this way it is less likely to be missed. In difficult cases the final stages of the search are best conducted under fluoroscopy, for then not only will the direction of the foreign body be observed, but its depth may be determined by placing the end of a probe where the body is thought to be, and then moving the *x*-ray tube to and fro: the relative parallactic movement of the shadows of the probe and foreign body will indicate which is the more superficial, since an object further from the screen obviously moves more than one close to it (see Fig. 4). It might seem almost redundant to add that the mere presence of a foreign body does not demand its removal; indeed, much damage may be done by unskilled attempts to do so. A case to illustrate this point is that of a dentist who, while preparing to use a dental drill, inadvertently ran it into the base of his finger, where the tip broke off. On *x*-ray examination about ¼ in. (3 mm.) of the drill was seen overlying the proximal phalanx. Ill-advised surgical attempts, under unsuitable conditions and local analgesia, were made to remove it, and these were not abandoned before a lot of damage had been done to nerves and tendons. Sepsis followed, and ultimately the finger had to be amputated. Examination now revealed that the drill tip was completely imbedded in the bony phalanx. Had it been left where it was no ill effects would have followed and the finger could have been used normally in a few hours.

A foreign body requiring special notice is the point of an indelible pencil. This occasionally breaks off under the skin when a person carrying one in his pocket falls. The chemical present in the "lead" produces local necrosis unless it is quickly removed. These cases should be treated by excision of the whole area stained by the dye, including, of course, the pencil tip.

A penetrating fish-hook is a specially difficult object to deal with, since the barb prevents withdrawal without causing further damage. Wherever possible, therefore, it

should be pushed on until the point penetrates the skin from within, the point then being cut off and the hook withdrawn along its original track.

Swallowed and Impacted Foreign Bodies

It is fortunate for the human race that Nature has provided a rather small orifice at the upper end of the alimentary canal so that most objects that succeed in running the gauntlet of the oesophageal entrance are able to negotiate the length of the canal beyond. The patients are usually children, inmates of asylums, or those attempting suicide, and there is no end to the list of objects that have at one time or another been swallowed—coins, buttons, toys, hair-grips, needles, nails, tooth-plates, and even open-bladed pocket-knives. Not all of them, however, pass successfully. The largest coin which passes into the oesophagus is usually a halfpenny (1 in.—2.5 cm.—in diameter); it is likely to be held up there, lying transversely, but it can be easily removed by means of the oesophagoscope. The older-fashioned buttons of bone or mother-of-pearl are slowly digested in the stomach, over a period of two to three weeks, and so even if initially large they will ultimately pass. Plastic and metal buttons, although not digested, have a good chance of passing spontaneously. Recent correspondence in the *British Medical Journal* has shown that the "kirbigrip" has particular difficulty in negotiating the duodenum, and in many cases has to be surgically removed. Nevertheless it is surprising how 1-in. (2.5-cm.) nails, even half a pound (230 g.) of them, will finally pass without trouble. One must be constantly on the alert, therefore, in dealing with these cases, observing the progress of the object with *x* rays if it is radio-opaque, and ready at any moment to resort to surgical removal. Yet it is worth remembering that a sewing-needle once swallowed by a young girl of 17 was found in an abscess at the back of her thigh when she was 70. Finally, it should be noted that a foreign body which has passed the whole length of the alimentary canal may eventually be held up in the anal canal and cause ulceration, proctitis, and ischio-rectal abscess.

Foreign bodies in the eyes were discussed in Mr. H. B. Stallard's article in this series (*Journal*, December 10, p. 1441). Foreign bodies in the ear and nose are seen usually in children as a result of deliberate insertion, although occasionally they become lodged there by accident. Beads, boot-buttons, peas, beans, and insects are the objects most commonly found, and it will be noted that some of these are likely to swell in the presence of moisture. In the ear, as with wax, syringing is the standard method of removal—insects, if alive, being first killed with chloroform vapour. It must, however, first be determined by inspection that the object is movable and not, as a result of swelling, jammed in the meatus. If it is movable suction may by tried. If this fails the object will have to be broken up with great care and skill under anaesthesia. In removing foreign bodies from the nose, the first essential is to use a decongestant—for example, cocaine hydrochloride 5%, 9 parts, adrenaline 1/1000, 1 part—to shrink the swollen mucosa. The body may then be pulled forwards by the use of a small loop of wire, a hairpin, or a crochet-hook, depending upon its consistence.

Paraphimosis

The reduction of a paraphimosis which is not of too long duration can usually be accomplished manually by holding the body of the penis between the index and middle fingers of each hand and then applying backward pressure on the glans with both thumbs. The essential preliminary to success, however, is that the oedematous swelling of the foreskin in front of the constricting band (actually the preputial orifice) must be reduced by slow steady pressure with the hand or by bandages. This will take time, but attempts at reduction before the swelling has been considerably diminished will probably be of no avail. If manual reduction should fail it is classically advised that the constriction, deeply buried under the swelling, should be divided by the point of a scalpel, but recently it has been found that the local injection of a small quantity (500 to 1,000 units) of hyaluronidase into the swelling brings about such a reduction of the oedema that surgery can generally be avoided—except, of course, the subsequent circumcision which may be deemed advisable.

Anal and Rectal Emergencies

Faecal impaction is not uncommon in older patients in whom the expulsive powers are weak. Its importance lies in its differentiation from malignant disease, but once this has been clearly established efforts must be made to remove the block. In many instances it will be necessary to break up the inspissated mass of faeces with the gloved finger, but in milder cases the whole process is rendered less troublesome by the repeated instillation into the rectum of about 4 oz. (115 ml.) of warm olive oil or medicinal paraffin oil. Owing to sphincter weakness some patients are unable to retain the oil long enough for it to be of use, but in others persistence for several days will soften the mass and allow it to be more easily removed or passed.

A thrombosed external pile or a prolapsed internal one can be so painful as to need urgent relief. For the former a small radial incision which allows the clot to be evacuated will bring quick comfort; for the latter, after the application of a cold lotion—Lotio Plumbi Evap. (*B.P.C.*)—and an injection of morphine, an attempt may be made to reduce it within the sphincter which is gripping it. The whole part should be well lubricated and then gentle finger-pressure applied, first to reduce the oedema and then to push back the swelling. Unfortunately in many cases the prolapse recurs when the patient next strains, and if radical surgical help is not at hand the process must be repeated, possibly, however, with less trouble on the second and subsequent occasions.

Prolapse of the rectum in infants and young children causes a lot of parental anxiety, but is not usually serious. Any cause of straining at stool should first be remedied, and at each defaecation the prolapsed bowel should be returned and the buttocks strapped together. Defaecation in the lateral position helps to prevent undue straining, but in recurrent cases it is worth while injecting about 3 ml. of phenol in almond oil into the submucosa at three points around its circumference. This produces an inflammatory reaction which attaches the mucosa to the deeper layers.

An acute painful fissure at the posterior anal margin (in women the fissure may very rarely be anterior) can be relieved quickly, first by the application of an analgesic ointment, such as cinchocaine or amethocaine, and then by injecting a small quantity of long-lasting local analgesic—for example, one containing butylaminobenzoate—under the floor of the fissure. A finger or dilator can then be passed full-length into the rectum to stretch the spastic sphincter. Many acute cases so treated need no further surgical measures.

The sudden acute rectal pain without organic cause known as proctalgia fugax is believed to be due to muscle spasm of the sphincter, levator ani, or both. Most patients find themselves some simple measure which brings relief—that is, the insertion of a finger, the passage of flatus, or the injection of air through a Higginson syringe—but if they have not discovered it the doctor can thus advise them.

Thanks are due to Miss Mary J. Waldron, of the department of medical illustration, Guy's Hospital, for preparing the illustrations.

Next article on Emergencies in General Practice.—"Coronary Thrombosis," by Dr. A. Morgan Jones.

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DICKENSIAN DIAGNOSES*

BY

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I am honoured by the invitation to deliver the Purvis Oration on this important occasion, the centenary of the West Kent Medico-Chirurgical Society, and so to commemorate both your foundation and your founder. Medical education is, or should be, a lifelong process, and local medical societies play an indispensable part in this, and combine with it the cultivation of friendship between doctors. All your guests unite in congratulating you upon a century of this good work and offer you their good wishes for the next hundred years.

I thought that, on an occasion when we are naturally looking back, we might take a short holiday from the medical world of to-day, with its many problems, and escape into a world created solely by a great imagination. And Kent suggested Dickens, who lived in Kent and loved it so much. This is a Dickens centenary, too, for a hundred years ago this month *Little Dorrit* was published, and there is this link between the two centenaries—that it was the very disease and poverty which Dickens was then describing which had called into being the Royal Kent Dispensary, from which your Society sprang.

Perhaps it is not surprising that disease should play a considerable part in the novels of Dickens. He took pleasure in portraying the bizarre, the grotesque, and, indeed, the horrifying; and, when he lived, the visible effects of disease were much more obvious than they are to-day. This is partly because the progress of medicine has fortunately eliminated many of its grosser manifestations, and partly because in Dickens's day there were few facilities for the segregation of people seriously afflicted in body or mind. What is surprising, however, is that he should have given such detailed and accurate descriptions of the disorders from which his characters suffered. He was not content with vague diagnoses like brain fever, which figure in the works of some of his contemporaries, and even of those who wrote much later. Dickens looked on disease with the observing eye of the expert clinician, and he recorded what he saw, and what the patient told him, so that he often gives us accounts which would do credit to a trained physician.

Head Injuries

Let me first illustrate this by showing how Dickens deals with two cases of head injury. In one he concentrates on the state of consciousness during the period immediately following the injury, and in the other he describes with great precision its persistent focal effects.

The first case is that of Eugene Wrayburn in *Our Mutual Friend*. Wrayburn was the victim of a murderous assault: here is Dickens's description of his condition two days after his injury.

"Sometimes his eyes were open, sometimes closed. When they were open, there was no meaning in their unwinking stare at one spot straight before them, unless for a moment the brow knitted into a faint expression of anger or surprise. Then, Mortimer Lightwood would speak to him and on occasions he would be so far roused as to make an attempt to pronounce his friend's name. But in an instant consciousness was gone again, and no spirit of Eugene was in Eugene's crushed outer form. . . . Hours and hours, days and nights, he remained in this same condition. There were times when he would calmly speak to his friend after a long period of unconsciousness, and would say he was better, and would ask for something. Before it could be given him, he would be gone again. . . . This frequent rising of a drowning man from the deep, to sink again, was dreadful to the beholders. But gradually the change stole upon him that it became dreadful to himself. His desire to impart something that was on his mind, his unspeakable yearning to have speech with his friend and make a communication to him, so troubled him when he recovered consciousness, that its term was thereby shortened. As the man rising from the deep would disappear the sooner for fighting with the water, so he in his desperate struggle went down again."

This is a remarkable description of the state of fluctuating consciousness which characteristically follows a severe head injury. Eugene Wrayburn recovered, and Dickens, for his own purposes, attributed his recovery to a somewhat sentimental form of psychotherapy, when the little dressmaker encouraged his friend Mortimer Lightwood to mention to him the name of the woman he wanted to marry.

So much for the post-concussional state: now let us hear Dickens's account of focal contusion of the brain. Mrs. Gargery, in *Great Expectations*, was also the victim of a murderous assault, having been "struck with something blunt and heavy, on the head and spine; after the blows were dealt, something heavy had been thrown down at her with considerable violence as she lay on her face." For a long time Mrs. Gargery lay very ill in bed. "Her sight was disturbed, so that she saw objects multiplied, and grasped at visionary teacups and wineglasses instead of the realities; her hearing was greatly impaired; her memory also; and her speech was unintelligible. When, at last, she came round so far as to be helped downstairs, it was still necessary to keep a slate always by her, that she might indicate in writing what she could not indicate in speech. . . . A tremulous uncertainty of the action of all her limbs soon became a part of her regular state." In this case the effects of head injury were deafness, double vision, impairment of memory, general tremulousness, and gross impairment of speech.

Dickens gives a very good account of this aphasic patient's efforts to make herself understood. "Again and again and again, my sister had traced upon the slate a character that looked like a curious T, and then with the utmost eagerness called our attention to it as something she particularly wanted. I had in vain tried everything producible that began with a T, from tar to toast and tub. At length it had come into my head that the sign looked like a hammer, and on my lustily calling that word in my sister's ear she had begun to hammer on the table and had expressed a qualified assent." Various hammers were brought to her, but it turned out that she had used the hammer to signify a man who worked with a hammer as assistant to her blacksmith husband.

Dickens incorporated in this clinical picture one curious and interesting observation: whereas before her injury Mrs. Gargery had been a virago, afterwards, Dickens said, "her temper was greatly improved, and she was patient."

Cerebral Arteriosclerosis

He reported another case of aphasia in the Honourable Mrs. Skewton, the mother of the second Mrs. Dombey, who evidently suffered from cerebral arteriosclerosis, and his account of her illness is remarkable not only for the accuracy of his description of individual symptoms but even more, perhaps, for the skill with which he conveys the relentless progress of the disease, with its insidious onset and catastrophic exacerbations. The first symptom was tremor. She had "a peach-coloured velvet bonnet; the artificial roses in which nodded to uncommon advantage,

*The Purvis Oration delivered on the centenary of the West Kent Medico-Chirurgical Society (see *Journal*, December 17, p. 1513).

as the palsy trifled with them, like a breeze": and, later, "the palsy played among the artificial roses again like an almshouse full of superannuated zephyrs." No other writer exhibits just this combination of grim and gay, this charnel-house humour, so characteristic of Dickens. That evening Mrs. Skewton had a stroke. "There she lay speechless and staring at the ceiling for days; sometimes making inarticulate sounds, in answer to such questions as did she know who were present and the like, sometimes giving no reply either by sign or gesture, or in her unwinking eyes."

"At length she began to recover consciousness and in some degree the power of motion, but not yet of speech. One day the use of her right hand returned; and showing it to her maid who was in attendance upon her, and appearing very uneasy in her mind, she made signs for a pencil and some paper. This the maid immediately provided, thinking she was going to make a will or write some last request, and Mrs. Dombey being from home, the maid awaited the result with solemn feelings.

"After much painful scrawling and erasing, and putting in of wrong characters, which seemed to tumble out of the pencil of their own accord,* the old woman produced this document—'Rose-coloured curtains.' The maid being perfectly transfixed, and with tolerable reason, Cleopatra amended the manuscript by adding two words more, when it stood—'Rose-coloured curtains for doctors.' The maid now perceived remotely that she wished these articles to be provided for the better presentation of her complexion to the faculty."

After this stroke Mrs. Skewton's temperament changed for the worse and she became jealous and exacting. Though she improved for a time, she soon began to deteriorate again. "Without having undergone any decided second attack of her malady, the old woman seemed to have crawled backward in her recovery from her first. She was more lean and shrunken, more uncertain in her imbecility, and made stranger confusions in her mind and memory. Among other symptoms of this last affliction, she fell into the habit of confounding the names of her two sons-in-law, the living and the deceased, and in general called Mrs. Dombey either 'Grangeby' or 'Domber' or indifferently both. . . 'Now my dearest Grangeby,' said Mrs. Skewton. 'You must positively prom'—she cut short some of her words, and cut out others altogether—'Come down very soon.'"

The tremor became worse; she "couldn't help nodding her bonnet over one eye, and rattling her knife and fork upon her plate in using them, as if she were playing castanets." There was a second stroke, "and then a dumb woman lies upon her bed, and she is crooked and shrunk up, and half of her is dead." She did not long survive it.

Besides giving an accurate picture of the course of cerebral arteriosclerosis Dickens shows that he knows that loss of speech is associated with paralysis of the right side of the body, and that in such cases there may also be agraphia. The closeness of his observation is shown by the accuracy of his description of the agraphic patient's attempts to write, and by the amalgamated words "Grangeby" and "Domber" which he puts into Mrs. Skewton's mouth. Hughlings Jackson many years later attributed Spoonerisms to a lack of co-operation between two cerebral hemispheres. An aphasic patient lived at a hostelry called "The Lobster and Crab," which he always called "The Lab and Crobster." It was as though, said Jackson, one half of his brain said "crab and lobster" and the other half "lobster and crab."

There are many other arteriopaths in Dickens. Sir Leicester Dedlock, in *Bleak House*, had a stroke which was precipitated by hearing of Mr. Bucket's suspicion of his wife: "They lay him down upon his bed, and chafe, and rub, and put ice to his head, and try every means of restoration. Howbeit, the day has ebbed away, and it is night in the room, before his stertorous breathing lulls, or his fixed eyes show any consciousness of the candle that is occasionally passed before them. But when this change begins, it goes on; and by and by he nods, or moves his eyes, or even his hands, in token that he hears and comprehends. . . . But now he can only whisper; and what he whispers sounds like what it is—mere jumble and jargon." Here is an anticipation of the term "jargon aphasia."

Mr. Dorrit, in *Little Dorrit*, died of some cerebral catastrophe which seems likely to have been vascular. One of his earliest symptoms was narcolepsy, and Dickens records that Mr. Dorrit would fall asleep several times during a meal. Not long after this he had a period of mental confusion and disorientation and thought that he was back in the Marshalsea. This was a dramatic touch, and Dickens exploited to the full the incongruity between Dorrit's wealthy surroundings and friends and the distresses of his early days through which he was living again. "They got him up to his room without help, and laid him down in his bed." For ten days he remained in this state of confusion, and then quietly sank into a coma and died.

Though Dickens, when it suited his purpose, used cerebral vascular disease to dispose of his characters with dramatic suddenness, the case of old Mr. Willet in *Barnaby Rudge* shows that he also knew that the prognosis of cerebral vascular lesions was not invariably bad. "Although the doctors all agreed, on his being attacked with symptoms of apoplexy," says Dickens, "that he ought to die, and took it very ill that he did not, he remained alive—possibly on account of his constitutional slowness—for nearly seven years more, when he was one morning found speechless in his bed. He lay in this state, free from all tokens of uneasiness, for a whole week" before he died.

Symptomatic Epilepsy

The death of Anthony Chuzzlewit gave Dickens an opportunity to describe an epileptic fit. There was a strange sound and, "looking round, they saw Anthony Chuzzlewit extended on the floor. . . . He had fallen from his chair in a fit, and lay there battling for each gasp of breath, with every shrivelled vein and sinew starting in its place. . . . It was frightful to see how the principle of life, shut up within his withered frame, fought like a strong devil, mad to be released, and rent its ancient prison-house. A young man in the fullness of his vigour, struggling with so much strength of desperation, would have been a dismal sight, but an old, old, shrunken body, endowed with praeternatural might, and giving the lie in every motion of its limb and joint to its enfeebled aspect, was a hideous spectacle indeed.

"They raised him up and fetched a surgeon with all haste, who bled the patient and applied some remedies; but the fit held him so long that it was past midnight when they got him up, quiet now, but quite unconscious and exhausted, into bed." He remained unconscious all night, but suddenly appeared next morning to Jonas Chuzzlewit and Mr. Pecksniff at breakfast. "He seemed to utter words, but they were such as man had never heard, and this was the most fearful circumstances of all, to see him standing there, gabbling in an unknown tongue." They wheeled him in a chair to the window and there he died.

The medical reader will have no difficulty in recognizing in this case a series of convulsions, resulting perhaps from cerebral arteriosclerosis, and terminating fatally. For the purposes of the plot, however, Jonas Chuzzlewit had to believe that his father had died from poison, which Jonas had put in his cough mixture, though, in fact, the old man had discovered the plot and only pretended he had drunk it. The poison is not stated, but Dickens may have had strychnine in mind. If so, this adds point to his choice of a convulsive disorder as the natural cause of old Anthony's death.

Paraplegia

There are a number of paraplegics in the pages of Dickens. Perhaps the best-documented case history is that of Grandfather Smallweed in *Bleak House*, who is "in a helpless condition as to his lower, and nearly so as to his upper limbs;

*Cf. Dr. Johnson on the effect of his stroke. "My hand, I knew not how nor why, made wrong letters."

but his mind is unimpaired." His legs are described as spindle legs. Grandfather Smallweed is provided with a cushion in order that he may have something to throw at his wife whenever she annoyed him, an act of jaculation which not only knocked Mrs. Smallweed sideways, but caused Grandfather Smallweed to collapse, and necessitated his being "shaken up like a great bottle and poked and punched like a great bolster" by his granddaughter. Mrs. Smallweed suffered from dementia, and I shall have more to say about her later. Mrs. Horace Crewler, the mother-in-law of Tommy Traddles in *David Copperfield*, was also a paraplegic, but there is a good deal of evidence that her paraplegia was hysterical. When Tommy Traddles proposed to Sophy Crewler, her father undertook to obtain his wife's consent. "'They had a dreadful time of it with her,' said Tommy; 'it mounted from her legs into her chest, and then into her head.' 'What mounted?' asked David Copperfield. 'Her grief,' replied Traddles, with a serious look. 'Her feelings generally. As I mentioned on a former occasion, she is a very superior woman, but has lost the use of her limbs. Whatever occurs to harass her, usually settles in her legs; but on this occasion it mounted to her chest, and then the head, and, in short, pervaded the whole system in a most alarming manner. However, they brought her through it by unremitting and affectionate attention.'"

A rather more difficult case for diagnosis is Mrs. Clennam, of *Little Dorrit*. She spent her life on a sofa. "'What with my rheumatic affection, and what with its attendant debility or nervous weakness—names are of no matter now—I have lost the use of my limbs. I never leave my room. I have not been outside this door for—tell him for how long,' she said, speaking over her shoulder. 'A dozen years next Christmas,' returned a cracked voice out of the dimness behind." Mrs. Clennam, however, astonished everybody towards the end of the novel by suddenly getting up and rushing out of the house. This saved her life, for she returned just in time to see the whole house collapse. After this "she never from that hour moved so much as a finger again, or had the power to speak one word. For upwards of three years she reclined in her wheeled chair, looking attentively at those about her and appearing to understand what they said; but the rigid silence she had so long held was ever more enforced upon her and, except that she could move her eyes and faintly express a negative and affirmative with her head, she lived and died a statue." Let me end this account of paraplegia with Dickens's description in *Dombey and Son* of a man with an ataxic gait, Cousin Feenix, Lord Feenix, "meaning to go in a straight line, but turning off sideways by reason of his wilful legs." He makes only one or two brief appearances. Here he is again; "giving his arm to Florence, and, putting the strongest possible constraint upon his wilful legs, which seemed determined to go out into the garden, he led her to the door." And, finally, "Cousin Feenix's legs consented to take him away."

Psychiatric Studies

Dickens's psychiatric studies are as comprehensive and as varied as his observations on organic nervous disease. He reports a considerable number of cases of dementia. Old Chuffey, Anthony Chuzzlewit's clerk in *Martin Chuzzlewit*, presents at first a good picture of senile dementia, but clinical accuracy had to be sacrificed to the needs of the plot, for Chuffey had to rouse himself from his dementia at the end of the story to give important evidence concerning the circumstances of Anthony Chuzzlewit's death. But there is no flaw in the picture of senile dementia which Dickens draws in Mrs. Smallweed, in *Bleak House*. "There has been only one child in the Smallweed family for several generations," wrote Dickens. "Little old men and women there have been, but no child, until Mr. Smallweed's grandmother, now living, became weak in her intellect, and fell (for the first time) into a childish state. With such infantine graces as a total want of observation, memory, understanding, and interest, and an eternal disposition to fall asleep over the fire and into it, Mr. Smallweed's grandmother has undoubtedly brightened the family." I have already mentioned her paraplegic husband. This was a neuropathic family, for Mrs. Smallweed's brother was Mr. Krook, the alcoholic, who died of spontaneous combustion.

Another strange character was Mr. F's aunt in *Little Dorrit*. "The major characteristics discoverable by the stranger in Mr. F's Aunt were extreme severity and grim taciturnity; sometimes interrupted by a propensity to offer remarks in a deep warning voice, which, being totally uncalled for by anything said by anybody, and traceable to no association of ideas, confounded and terrified the mind. Mr. F's Aunt may have thrown in these observations on some system of her own, and it may have been ingenious, or even subtle; but the key to it was wanted."

It is possible that Mr. F's aunt was an elderly schizophrenic. Here is an example of her conversation. "Mr. F's Aunt, after regarding the company for ten minutes with a malevolent gaze, delivered the following fearful remark: 'When we lived at Henley, Barnes's gander was stole by tinkers,'" More appropriate to this evening is her "inexorable and awful statement: 'There's mile-stones on the Dover road!'" She readily became aggressive if replied to, and on one occasion she had to be led from the room, to which she offered no resistance. Dickens describes her as "sitting upright in a cataleptic state since her last public remark."

No better example of chronic hypomania could be found in a textbook of psychiatry than the man in *Nicholas Nickleby* who made advances to Mrs. Nickleby over the garden wall. The appearance of the old gentleman above the wall was preceded by a shower of vegetables. "An old black velvet cap . . . was gradually followed by a very large head, and an old face in which were a pair of most extraordinary grey eyes: very wild, very wide open, and rolling in their sockets, with a dull languishing leering look most ugly to behold.

"'Queen of my soul,' said the stranger, addressing Mrs. Nickleby, 'this goblet sip!' . . . 'I have estates, Ma'am,' said the old gentleman, flourishing his right hand negligently, and speaking very fast; 'jewels, lighthouses, fishponds, a whalery of my own in the North Sea, and several oyster beds of great profit in the Pacific Ocean; my walking-stick is to be seen on application to the Chaplain of the House of Commons, who is strictly forbidden to take any money for showing it. I have enemies about me, Ma'am,' he looked towards his house and spoke very low, 'who attack me on all occasions, and wish to secure my property. If you bless me with your hand and heart, you can apply to the Lord Chancellor or call out the military if necessary—sending my toothpick to the Commander-in-Chief will be sufficient—and so clear the house of them before the ceremony is performed. After that, love, bliss, and rapture; rapture, love and bliss. Be mine, be mine!'" The elation, grandiosity, flight of ideas, amorousness, and loose paranoid delusions are all typical.

Multiple Personality

Perhaps the most remarkable example of Dickens's psychiatric insight is the case of Dr. Manette in *A Tale of Two Cities*. It is remarkable for the accuracy of his account of a case of multiple personality and loss of memory, because it is the most comprehensive of his studies of psychological abnormality, and because it includes an anticipation of psychotherapy. Dr. Manette had been imprisoned for many years without trial in the Bastille during the French Revolution. As a prisoner he had been a shoemaker, and after his release he lived in a garret in Paris and spent his time working at a low bench making shoes. Subsequently he went to London, but had lost his memory for a long period of his life. He said: "My mind is a blank, from some time—I cannot even say what time—when I employed myself, in my captivity, in making shoes, to the time when I found myself living in London with my dear daughter here. She had become familiar to me, when a gracious God restored my faculties; but, I am quite unable even to say how she had become familiar. I have no remembrance of

the process." Dr. Manette had long given up his shoemaking and was practising in London when his daughter's marriage brought about a relapse. No sooner had she gone away with her husband than the doctor was found back at his shoemaking and unable to recognize his friends. He remained in this state for ten days, and then he was found one morning with the shoemaker's bench and tools put aside in his usual morning dress. "He at first supposed that his daughter's marriage had taken place yesterday. An incidental allusion purposely thrown out, to the day of the week, and the day of the month, set him thinking and counting, and evidently made him uneasy."

His friend Mr. Lorry now embarked upon the psychotherapy. He thought it best to present Dr. Manette's case to himself as though it was that of a patient. He described to Dr. Manette someone who had had a great mental shock and who had suffered from a relapse. He led him gradually to the recognition that the case was his own and then asked him "'to what would you refer this attack?' 'You have no idea,' said Dr. Manette, 'how such an apprehension weighs on the sufferer's mind, and how difficult—how almost impossible—it is, for him to force himself to utter a word upon the topic that depresses him.' 'Would he,' asked Mr. Lorry, 'be sensibly relieved if he could prevail upon himself to impart that secret brooding to anyone, when it is on him?' 'I think so. But it is, as I have told you, next to impossible. I even believe it—in some cases—to be quite impossible.'" But by degrees the resistance is overcome, Dr. Manette's analysis proceeds, and he is led to regard his shoemaker's bench as a symbol both of the past and of his neurosis, and to agree to its destruction. "Very strange," says Dickens, "to see what a struggle there was within him." But although Dr. Manette was relieved he was not cured, and he relapsed again when he failed to rescue Darnay from the guillotine at the trial in Paris. He disappeared, wandered about, and when he came back demanded his shoemaker's bench. He was back in the past. "Time presses: I must finish those shoes." This time the relapse was permanent, and the last we see of Dr. Manette is as a "helpless, inarticulately murmuring, wandering old man."

Dickens's Mental Defectives

The best-described mental defective in Dickens is Barnaby Rudge, round whom the story of that name revolves. Dickens gives us his appearance in some detail. "Startling as his aspect was, the features were good, and there was something even plaintive in his wan and haggard aspect. But, the absence of the soul is far more terrible in the living man than in a dead one; and in this unfortunate being its noblest powers were wanting. . . . The fluttered and confused disposition of all the motley scraps that formed his dress, bespoke, in a scarcely less degree than his eager and unsettled manner, the disorder of his mind, and by a grotesque contrast set off and heightened the more impressive wildness of his face." There are two other striking passages in *Barnaby Rudge*. In one Dickens describes the feelings of the mother of a mentally defective child, and in the other the happiness of which such a child is capable. "Two and twenty years. Her boy's whole life and history. The last time she looked back upon those roofs among the trees, she carried him in her arms an infant. How often since that time had she sat beside him night and day, watching for the dawn of mind that never came; how had she feared, and doubted, and yet hoped, long after conviction forced itself upon her! . . . The slow and gradual breaking out of that one horror, in which, before his birth, his darkened intellect began; how, in the midst of all, she had found some hope and comfort in his being unlike another child, and had gone on almost believing in the slow development of his mind until he grew a man, and then his childhood was complete and lasting."

And here is the second passage. "It is something to look upon enjoyment, so that it be free and wild and in the face of nature, though it is but the enjoyment of an idiot. It is something to know that heaven has left the capacity of gladness in such a creature's breast; it is something to be assured that, however lightly men may crush that faculty in their fellows, the great Creator of mankind imparts it even to his despised and slighted work. Who would not rather see a poor idiot happy in the sunlight, than a wise man pining in a darkened jail!"

There are other brief sketches of mental defectives in Dickens. I will mention only one—Maggy, Mrs. Bangham's granddaughter in *Little Dorrit*. Maggy had become mentally defective after an acute illness at the age of 10. "'When Maggy was 10 years old,' said Dorrit, watching her face while she spoke, 'she had a bad fever, sir, and she had never grown any older ever since.'" Maggy was treated for this illness in the hospital which she described as "a Ev'nly place!" Such an illness may well have been some form of meningitis or encephalitis. That might be inferred on general grounds. But listen to Dickens's clinical observations. "She was about eight and twenty, with large bones, large features, large feet and hands, large eyes and no hair. Her large eyes were limpid and almost colourless; they seemed to be very little affected by light, and to stand unnaturally still." Was this the first account of what came to be known as the Argyll Robertson pupil?

There are many more clinical miniatures in Dickens—the fat boy in *Pickwick*, the first recorded instance of the association of narcolepsy with obesity; Major Joey Bagstock, in *Dombey and Son*, the blue-faced Major, with the lobster eyes and horse's cough, panting, blowing, and gasping with his bronchitis and emphysema; and many others. But I have said enough to show that, at a time when medicine itself was only just beginning to recognize the importance of physical signs, the characters in the world of Dickens's imagination are so real that they have recognizable diseases of body and mind, described with the accuracy and insight of a great clinical observer.

RADIOLOGICAL PROTECTION

Sir ERNEST ROCK CARLING took "Radiological Protection" as his subject for the three Harben lectures he delivered before the Royal Institute of Public Health and Hygiene on December 5, 6, and 7. Basing himself on already published work, he reviewed the risks from ionizing radiations to individual and community and the means of combating them. Like other speakers on the role of preventive medicine in an industrial age, Sir Ernest was at pains to stress the responsibility of the individual for his own health. "When every useful protective device is in full operation," he said at the conclusion of the lectures, "safety ultimately depends on conduct." The Harben lectures are addressed primarily to medical officers of health, and the preventive aspect of the subject was well to the fore. The first lecture concerned the damage ionizing radiations can do to man; the second the methods of protecting people from radiation "of an intensity likely to be met with in the age of atomic industry"; and the last some reflections on genetic damage to future generations. From this very broad field only some of the subjects Sir Ernest Rock Carling touched upon can be summarized here.

Nature and Magnitude of Man's Exposure

Some radiation was experienced by everyone, he said, inescapably and continually throughout their lives. This came from outer space, the air, the rocks beneath, and potassium in the body. Others were additionally exposed: from radiological procedures, or occupationally as in research or increasingly now in industry. The explosion of bombs had from time to time raised the peak of background measurements temporarily. In Sweden the total yearly dose from all sources per inhabitant had been calculated. For those occupationally exposed—less than 10,000 of the total population of nearly seven million—it averaged less than 1 r; for the 600,000 submitted to *x*-ray examination each year, less than 10 r; but for the whole population it averaged less than 0.002 r to the *whole body*, or less than

1 r to a *part* of it. Thus the average total dose received by each inhabitant before and during fertile age, even allowing a span of 50 years, was from natural radiation about 3 r and from other sources an additional 0.05 to 1.5 r a year. In the United Kingdom an estimate of the total dose received by all radiological workers, and the total dose to the gonads of all those examined radiologically before the age of 30, when averaged over the whole population—and so far as genetic damage was concerned the "total gonad mass" was the target that mattered—gave a dose per head, each generation, of less than one-thirtieth of the natural radiation level.

For those occupationally exposed, the maximum permissible level for whole-body radiation had been set at 0.3 r per week. For a "large" population—arbitrarily fixed at one-tenth of the total population—the permissible dose had been put at 0.03 r per week, which in 30 years amounted to 47 r. It might well be that for a *total population* the permissible amount should be reduced by a further factor of 10 to 0.003 r per week. If this last figure were accepted, that would give a cumulative dose over the whole prefertile and reproductive period of 7.5 r. Even so, a caveat was necessary. The ultimate criterion of radiological safety was the genetic one, and "any increase in ambient radiation, any considerable increase in the proportion of the population receiving dosage from external radiation, must be watched and recorded, whilst any possibility of inhalation or ingestion of radioactive substances should be forestalled."

Control of Radioactive Materials

Existing legislation in Britain allowed for control of the acquisition of radioactive materials and of machines for emitting radiations. At present import was controlled, but sale, though supervised, was not under legal sanction. There was no effective check upon disposal by a first purchaser, and the time might be approaching when it would be important to know the location of all such sources. The licensing of users would present great practical difficulties, while the partial substitute of licensing apparatus would require an adequate inspectorate to make it effective. There were good reasons why no regulations with the force of law should be introduced unless proved indispensable. The alternative was a "code of conduct." Since 1928 there had been an internationally agreed series of recommendations, modified from time to time and very widely acted upon. Their observance was reinforced by the possibility of claims at law for damages in the case of injury and the reaction of insurance companies if recommended precautions were neglected.

The medical officer of health, while not concerned with the therapeutic and diagnostic hazards of radiation, was concerned with the disposal of active waste. Nothing could be done to alter the radioactivity of such material, nor to hasten its decay. Sooner or later it must be disposed of in a safe place. Excreta from patients treated with radioactive isotopes were generally safe enough to flush into the ordinary sewage system; if necessary they might be stored under shielding until sufficient decay had taken place; or in a large department it might be necessary to limit the daily amount discharged into the sewers. More active material from laboratories might need to be buried in marked pits. A "spill" might involve enclosure of the material in a concrete box and disposal at sea. In industry, the use of *x* rays in unprotected surroundings, as in the examination of welds in shipbuilding, presented another public health problem. Nowadays there were many industrial applications of radioactive isotopes that fell under inspection by the Ministry of Labour; and others that did not. This widespread use provided problems of safe transport, storage, and handling. All mechanical aids to protection would be useless if personal discipline were not good. To use isotopes safely required training, but errors tended to creep in and supervision was necessary. It remained to be seen whether with the widening use of isotopes the less well trained could be constrained to take adequate precautions. "It seems to me," said Sir Ernest, "that the responsibility for exercising that constraint or at least for indicating where the necessity for it has arisen must fall on public health authorities."

Genetic Influence

In the last lecture Sir Ernest Rock Carling broached the difficult subject of the genetic effects of ionizing radiations. Such human evidence as was forthcoming, they had been told, was apparently not at serious variance with the results of experiments on smaller mammals, flies, and plants. But even the rate of "natural" gene mutation in man was unknown, as also was the proportion of it due to ambient radiation: some said a dominant amount; others a minimal; but what the alternative causes might be remained a little speculative. It appeared that, while for most of the bodily effects of radiation there was a threshold dose, there was none for genetic effects; moreover, all doses were cumulative.

If natural mutation was even in part due to radiation, then all mankind had accumulated during fertile lifetime a dose to the gonads of the order of 3 r. The very generally accepted figure for doubling the mutation rate was 50 r per generation, and it had been inferred that it would be unsafe to allow more than 20 r per capita per generation. Perhaps 12.5 r might be the figure to aim at; at least it was a convenient level to bear in mind when considering both individual and mass permissibility.

FIRST PROVINCIAL MEETING OF THE ROYAL COLLEGE OF SURGEONS

SYMPOSIUM ON MALIGNANT DISEASE

On December 10 the Royal College of Surgeons of England met in Manchester. The occasion was unique: it was the first provincial meeting of the College, and also the College's first scientific meeting. In the morning cases were demonstrated at the Manchester Royal Infirmary. In the afternoon there was a symposium in the University, under the chairmanship of Professor DIGBY CHAMBERLAIN, on "Malignant Disease."

Hormone Dependence

The first speaker was Professor GEOFFREY HADFIELD, whose subject was "Research in Cancer." He focused attention on the present work on hormone dependence in cancer. In hormone-dependent tissues, he said, normal growth, development, and function were strongly influenced by hormones, especially by those from the pituitary. Several hormones acted in this way, and there was synergism between them. Some cancers were independent of hormonal influence throughout their growth, while others, initially dependent, later became so. Some cancers were dependent on ovarian oestrogens, some on adrenal oestrogens or even on some other adrenal steroid, for their progression. But of primary importance was the dependence of certain cancers on pituitary hormones. In order to successfully inhibit a malignant growth, the extirpation of an endocrine gland had to be complete: the rapid hyperplasia of any remnant following excision suggested that as little as 2% left behind could rapidly regenerate to produce the hormones required. The best example of hormone dependence was provided by the cyclical changes of the uterine endometrium. It was shown, too, in Fould's breast cancer in mice, which was strictly conditioned by pregnancy. Thus at the end of each of a succession of pregnancies the growth of this cancer ceased, yet a time came when the cancer continued to grow apace in spite of further pregnancies. This was an example of a hormone-dependent growth becoming independent.

Breast Cancer and the Pituitary

Of great interest was the pituitary-dependence of breast cancer, continued Professor Hadfield. Young virgin, castrated, and hypophysectomized rats showed atrophy of the

breasts. Atrophy persisted in spite of the exhibition of oestrogen, oestrogen and progesterone, or oestrogen, progesterone, and growth hormone. If, however, prolactin was given, the structure of the mammary ducts was maintained. If the other hormones mentioned were added to the prolactin, the breasts developed to those of a full-term pregnancy. If in addition to all these hormones the rat was treated with corticotrophin and hydrocortisone, the breasts proceeded to secrete milk. Duct growth, alveolar development, and lobule formation needed prolactin together with progesterone and oestrone. For lactation, corticotrophin or cortisone and growth hormone were needed in addition. These observations showed that there was synergism between the various hormones.

In addition optimum concentrations were needed. No mixture of hormones lacking prolactin seemed capable of stimulating mammary growth, while prolactin by itself appeared able to maintain the gland. Similarly prolactin seemed responsible for the maintenance of breast cancer. As a glycoprotein of low molecular weight, it might be excreted in the urine and thus be available for biological assay.

How could the laboratory answer the question, "Is this tumour hormone-dependent?" asked Professor Hadfield in conclusion. In the first place the vaginal cytology might give some quantitative indication of the circulating oestrogens; or, secondly, an estimation of urinary oestrogen by the Kober reaction might provide similar information. Thirdly, bioassay of urinary gonadotrophin—also a glycoprotein—might indicate pituitary-hormone-dependence of the sex glands. At the Royal College of Surgeons research was proceeding on the estimation of the mammotrophic activity of urine from women. Male weanling mice were injected for five days with treated urine extracts and the breasts then examined histologically. The index of activity was the degree of growth produced by this mammotrophic material—which might well be prolactin itself.

Restraint in Cancer Surgery

Professor IAN AIRD spoke on "Operable Cancer." He began by drawing attention to the "five-year cure," examining the conception critically. Although that criterion had constituted a great advance in the assessment of the results of cancer surgery, it had its defects. For example, the traditional technical descriptions of surgical procedures by great men had lapsed: instead we now had something akin to a competition of figures. Professor Aird maintained that the only real cure of cancer could be offered by surgery, not by the other methods of treatment such as radiotherapy and chemotherapy.

It was because of this preoccupation with five-year cure rates, went on Professor Aird, that more radical and extensive procedures were increasingly being performed, although it was questionable if they were always in the patient's best interests. Thus stage I breast cancer was still very adequately treated by orthodox surgery, and produced in that way a five-year cure of between 70% and 85%. Extended surgery, involving the thorax, a clavicular resection, and block dissection of the neck, might increase the surgeon's five-year cure figure by 5%, but at the same time it caused not only a slightly higher operative mortality but also more subsequent disability to the patient from the operation itself. In another field the thoracic surgeons were returning to lobectomy for carcinoma of the lung—possibly at the expense of their five-year cure rates—because such a procedure might be in the patient's best interests during his period of survival. Professor Aird made a plea for similar restraint in the surgery of carcinoma of the stomach. Partial gastrectomy should be considered more often, and radical gastrectomies viewed with more caution. He was inclined more often than formerly to perform a palliative operation in cases of cancer of the pancreas. There was room for more kindness in the scope of cancer operations.

Inoperable Cancer

Sir STANFORD CADE was the third speaker. He discussed "Inoperable Cancer." "Inoperability," he said, suggested to the patient's family everything that was worst. But this should no longer be the case. Palliative control of cancer was of the greatest importance: it could be compared with the accepted management of other chronic diseases, such as some cardiac disorders, diabetes, psoriasis, or epilepsy. The sting was taken out of "inoperability" if a longer survival with a nearly normal life was attained. Surgery was necessary for the relief of complications such as obstruction of the bowel, sometimes for the removal of certain endocrine glands, and on occasions for curative procedures. It was the surgeon's responsibility to distinguish two types of inoperability—the technically and the biologically inoperable. The operations must vary in scope because, just as there was no single disease in cancer, so there was no single treatment for it. Both radiotherapy and surgery had their limitations, and there were certain cancer cases in which both were contra-indicated.

After radiotherapy in the control of inoperable cancer, certain "mitotic poisons" required acknowledgment. Thus nitrogen mustard might help in, for example, Hodgkin's disease when radiotherapy was no longer applicable. Although such drugs might be introduced quickly, their value might take years to assess. After chemotherapy reference must be made to therapy with hormones. Their mode of action in changing the internal environment was obscure, as was shown by the apparent benefit derived from both oestrogens and androgens in some types of new growth. Although a general bodily, symptomatic improvement might follow hormone therapy, the cancer might sometimes in fact be getting worse; both these changes indicated that the patient and his cancer alike would thrive on an increase of that hormone.

In Sweden there was a State Register for cancer which showed that at some sites 80% of the patients were inoperable. The quarter of a million people affected each year by cancer in England and Wales would probably show the same degree of inoperability. Although the treatment of these patients was palliative, sometimes remarkable recession occurred with *x*-ray therapy alone. Modern radiotherapy machines were more efficient and kinder in that they damaged normal tissue less and yet emitted a higher tumour dose. This was particularly true of the linear accelerator and the teraton. Palliative treatment with oestrogens for breast cancer was best reserved for elderly women whose growths had been present for many years. In the surgery of the inoperable case the patient's comfort was of paramount importance. With that in mind pelvic evisceration was sometimes indicated, and so was adrenalectomy, if life could thus be made nearly normal, even for only a short period. Lastly, the surgical relief of pain was of great importance in the management of the inoperable case.

Cancer in General Practice

Dr. DOUGLAS FRENCH ended the symposium with an account of cancer in general practice. About 0.4% of his patients developed cancer each year, and of about 240 seen in the past twelve years 28 remained alive. Dr. French stressed the difficulty patients experienced in assisting with the early diagnosis of cancer. Fear and ignorance were largely responsible, and the practitioner had constantly to be on guard against such expressions as "piles" or "periods" when they could so easily be symptoms of carcinoma of the colon or cervix. A particular difficulty here was presented by the patient who frequently attended the surgery with a variety of symptoms, so that his ultimate symptoms of early cancer could very easily be overlooked. This difficulty was the greater if an almost chronic loss of well-being was a feature of the case; a real change in general health could be insidious and easily overlooked. Dr. French stressed the need for a charitable understanding of the patient's reluctance to report cancer symptoms early, in view of the results

of treatment still being so often very disappointing. He thought that the failure of an anaemic patient to respond to intravenous iron therapy within six weeks indicated the likelihood of a serious causal disorder. A further reason for the late diagnosis of cancer was the "normal report" of specialists to whom patients had been referred. This might have such a reassuring effect on the family doctor and the patient's home alike that the development of later, relevant symptoms might be overlooked. Negative *x*-ray examinations of the alimentary tract could be particularly misleading.

In the management of these cases at home, both the patient's wish to live and the presence of complicating disorders had to be taken into account when recommending a programme of treatment. Dr. French thought that patients should sometimes be told that they had cancer when their initial optimism had given way to doubt. It was also helpful if surgeons explained to patients, in understandable terms, what their treatment had involved. The surgical relief of pain was of great value in the home management of cancer, while the use of analgesics was assisted by changing the brand or preparation as the patient's symptoms altered. Every encouragement should be given for a quick return to work. Because radiotherapy meant cancer to so many people, patients undergoing that treatment from home required the reassurance of frequent visits by their doctor. The family doctor should make a practice of examining his conscience at the end of his period of attendance on each "hopeless" case.

Hon. F.R.C.S. for Sir John Stopford

At the conclusion of the symposium Sir JOHN STOPFORD, F.R.S., Vice-Chancellor of Manchester University, was presented with an Honorary Fellowship of the Royal College of Surgeons. Sir ERNEST FINCH, Vice-President of the College, described some of Sir John's outstanding achievements, in particular his service to anatomy. His M.D. thesis had dealt with the distribution of the arteries to the pons and medulla and with the blood supply of the mid-brain. He had described the anterior spinal artery thrombosis and the posterior inferior cerebellar artery thrombosis syndromes. He had been professor of anatomy at Manchester from 1919 to 1938, and was made a Fellow of the Royal Society in 1927. He was now professor of experimental neurology. Sir HARRY PLATT, F.R.C.S., then presented Sir John with his Fellowship, and he in reply paid tribute to Sir Harry both as a friend and as President of the College.

Nova et Vetera

MUNGO PARK (1771–1806)

The closing years of the eighteenth century saw a revived interest in Great Britain in the exploration of Inner Africa, contributed to in some measure by the famous journey of James Bruce through Abyssinia (1770–2). The African Association was founded in London (1778), and it was through its agents that knowledge was gained of the Niger regions. Mungo Park was the first to reach that river.

Born at Foulshiels, near Selkirk, on September 10, 1771, Park was the seventh of thirteen children. He was educated privately and at the local grammar school, and was destined for the Church, but showed a liking for botany and medicine, and so was apprenticed to Thomas Anderson, surgeon at Selkirk, with whom he served for three years. Removing to Edinburgh (1789), he spent three sessions there qualifying as a surgeon but not graduating. Thereafter he repaired to London to seek his fortune and stayed with his brother-in-law, James Dickson, a well-known botanist, and by him Park was introduced to Sir Joseph Banks. Through the latter's good offices, Park sailed as assistant surgeon on the *Worcester*, East Indiaman, for Sumatra (1792), and during this expedition he pursued his botanical and biological studies with acceptance to his patron.

In 1795, again on Sir Joseph Banks's recommendation, he was appointed by the African Association "to pass on to the River Niger . . . to ascertain the course, and, if possible, the rise and termination of that river," and he set sail from Portsmouth in the brig *Endeavour* for the Gambia in May of that year. In July he reached Pisania, a trading post 200 miles up the Gambia, and stayed there for five months, during which time he had his first severe attack of fever. Setting forth on his exploration with a negro servant, a boy, two asses, and a horse, Park reached the Niger in July, 1796, after incredible hardships, and explored the river for a considerable distance, both up- and downstream. Another attack of fever delayed his return to Pisania, which he reached 18 months after setting out on his expedition. He arrived at Falmouth in December, 1797, two and a half years after leaving the shores of Britain on this exploration. He soon returned to Foulshiels, and there wrote his celebrated *Travels in the Interior of Africa*, which was published in London in 1799.

In August, 1799, he married Alison, eldest daughter of his old chief, Dr. Anderson, and remained at Foulshiels for the next two years, regaining strength after the privations of his Niger expedition. But the call of Africa was still strong in his blood, and, after a period as a surgeon in Peebles, he accepted a Government proposal to command an expedition into the interior of Africa with a view to extending British commerce and enlarging geographical knowledge. Park proposed to reconnoitre a route to the Niger by which trade could be carried out and to follow the river to its outflow into the sea. In preparation for the expedition he chose Alexander Anderson, his brother-in-law and a surgeon, as second in command, and George Scott, also of Selkirk, as artist to record the journey. Park was also empowered to enlist 45 soldiers from the garrison of the island of Goree to form a bodyguard for the expedition. By reason of numerous delays he could not sail from Portsmouth until January, 1805, and this meant that when he reached Pisania in April the rainy season would be almost upon them. Nevertheless, Park, doubtless feeling that a further delay of some six months would lower morale, set out with his party. But before long disaster overtook them, and of 40 white men, including Park himself, only eleven reached the Niger. Scott and later Anderson died, and finally only four whites, one demented, and a native guide were left with Park. This small party set out on their passage down river on, as near as can be ascertained, November 19, 1805. Park hoped to reach the coast at the end of January, 1806, but his party was attacked at Boussa, and Park and his companions were killed or drowned, only the guide escaping.

Park was the first European of modern times to see and describe the upper Niger, which he was convinced "could flow nowhere but into the sea." In 1839 a handsome monument to Park was erected at Selkirk. The memory of this great explorer, who was also a doctor, will be honoured at the end of this year or early in 1956 on the one hundred and fiftieth anniversary of his death.

H. P. TAIT.

At a ceremony in Sydney on November 29 the Australian Minister for External Affairs, Mr. R. G. CASEY, formally handed over to the Indian High Commissioner a specially equipped hospital ship to serve the 30,000 people living in the Andaman and Nicobar Islands. The ship was chosen by the Indian Government and bought and converted by the Australian Government at a cost of £A.55,000. She is 85 ft. (26 m.) long, diesel-powered, and has a cruising range of 3,000 miles. She is equipped with an operating theatre, a dispensary, doctors' quarters, a sick bay for six people, and crew's quarters. The ship is a gift to India under the Colombo Plan.

Correspondence

Because of the present high cost of producing the Journal, and the great pressure on our space, correspondents are asked to keep their letters short.

Oxytocin in Labour

SIR,—Readers who are encouraged by Dr. D. Llewellyn-Jones (*Journal*, December 3, p. 1364) to use intravenous oxytocin in either the induction of labour or its maintenance will lessen the dangers of foetal damage or death due to uterine spasm if they make a practice of having amyl nitrite capsules available near the patient before the infusion is started. Experience of oxytocin infusion has shown that patients differ widely in their response to its action. The most minute doses can on occasions cause anxiety by the tremendous uterine response invoked. Prolonged contraction with foetal distress can be quickly relieved by stopping the infusion and administering the nitrite by inhalation.

Dr. Llewellyn-Jones advises using oxytocin in selected cases of ante-partum haemorrhage, including placenta praevia, and in the induction of labour when there is intrauterine foetal death. In both cases it can be highly dangerous. Powerful contractions can result in alarming and sometimes fatal haemorrhage in placenta praevia and maternal collapse from amniotic emboli with a dead foetus. It would be safer to include these two conditions in the list of contraindications to the use of intravenous oxytocin.—I am, etc.,

Oxford. J. STALLWORTHY.

SIR,—Dr. Derek Llewellyn-Jones in his interesting paper on the place of oxytocin in labour (*Journal*, December 3, p. 1364) has pointed out some of the disadvantages of an intravenous oxytocin drip.

In my practice the much-maligned drug dihydro-ergotamine, in intramuscular doses not exceeding 0.25 mg., has proved absolutely safe and of great value in relaxing the cervix which fails to dilate in labour in the presence of strong uterine contractions. This type of labour is liable to occur when the cervix at term is abnormally tight, the canal frequently still present, and the os often posterior. If such a cervix is found at induction one fears delay. Therefore, during 1955 it has been my practice in such cases to insert a Drew Smythe catheter if possible, withdrawing the liquor and then giving up to 3 doses dihydro-ergotamine 0.25 mg. intramuscularly 4-hourly. Labour frequently began after 1 or 2 doses. In a few cases the drug has been given when it proved impossible to insert the catheter, and 36 hours later the softened cervix has made induction relatively easy.

Twenty-two out of 149 primigravidae induced—that is, 14.7%—had the type of cervix described. Ten were induced for toxaemia, six at term because of an android pelvis, and the rest for postmaturity or a breech presentation. In three cases meconium was present in the liquor at induction, and in one other case the foetal heart was rapid and irregular. The foetal mortality was nil. One with meconium at induction was delivered by caesarean section, when the cervix was half dilated, because of disproportion. Four of the babies were premature, with weights between 4 lb. 3 oz. (1.9 kg.) and 5 lb. 8 oz. (2.5 kg.).

The following table shows the interval between induction and the onset of labour, also the duration of the first stage.

The two with a prolonged first stage had typical primary uterine inertia, one associated with a breech presentation and the other a persistent occipito-posterior.

	Induction—Onset of Labour	Duration First Stage
Less than 6 hours ..	7	9
6–12 hours	3	6
12–24 ,, ...	4	4
24–48 ,, ...	4	2
Over 48 ,, ...	4	

As previously stated, there was no foetal mortality. Thirteen patients had spontaneous deliveries, three were breech deliveries, and one had a caesarean section. Five required forceps, three because of the outlet contraction, one because of a persistent occipito-posterior position, and one for uterine inertia. All mothers were satisfactory.

Although these numbers are small, the successful outcome in a difficult group of cases seems to indicate that dihydro-ergotamine is a useful drug when an abnormal cervix is discovered at induction. It is safe and causes no maternal discomfort, and therefore is preferable to an intravenous oxytocin drip.—I am, etc.,

Birmingham. JEAN L. HALLUM.

Chemotherapy in Primary Tuberculosis

SIR,—I am not surprised that my letter (*Journal*, October 29, p. 1084), calling attention to a possible danger from antibiotic drugs in certain cases of primary tuberculosis in childhood, has not been followed up so far by other correspondents. The subject is not unimportant, as throughout the country very many small children with tuberculosis are being given anti-microbial therapy. But no single worker can possibly have large enough numbers on which to base conclusions in the different types of case, and my own figures were totally inadequate. Nor will the picture become sufficiently clear in the course of time, as you seemed to infer in your leading article on the same date (p. 1072), unless steps are taken on a very wide scale to test the points at issue. Incidentally, may I correct the statement in that leading article that my colleagues and I estimated that "approximately 6% of the infected children under 2 died before antibacterial drugs became available"? Our figure of 6% referred to children in the first year of life only.

When one considers that only 1% or 2% out of every 100 children in the first two years of life become infected with tuberculosis in this country at the present time, it is clear that to test the value of antibiotics in small children is no easy task. Moreover, tuberculosis in childhood is a much more protean and complex disease than in adults, in whom the criteria for estimating results were relatively easy. In adults sputum conversion and radiological retrogression were all-important. Additional, if not totally different, criteria would be required in the case of children. In the very young child the most important result to look for would be a reduction in the expected rate of haematogenous complications, whereas in the child round about puberty an assessment would depend largely on whether or not adult type disease supervened subsequently.

Some of the main questions that call for answer are as follows: Are antibiotics useful in infected children who show (*a*) segmental lesions, (*b*) pleural effusion, and (*c*) only enlargement of the mediastinal glands or a primary complex? Are antibiotics indicated for particular age groups of infected children—for example, those under 2 years of age and those round about puberty? Does the administration of antibiotics to children with primary tuberculosis reduce the risk of adult type disease developing in later years?

Clearly, as you so rightly say in the leading article in your issue of November 12 (p. 1195), "only controlled trials can answer the question whether such [antibiotic] treatment reduces the risks of infection." Large series are already being undertaken in the U.S.A. and in France. But must we wait for the results of others; and will we be satisfied with them when they come to hand? The history of B.C.G. in England would seem to answer both questions in the negative. The M.R.C. chemotherapy trials in adult tuberculosis have been a model for the world and have shown that we have unrivalled opportunities through our public medical schemes for carrying out a scientific assessment. Those in central authority ought to organize suitable trials without further delay.—I am, etc.,

Brentwood, Essex. F. J. BENTLEY.

Simple Blood-grouping Method

SIR,—It reveals a curiously uncritical attitude when two directors of the National Blood Transfusion Service are prepared to make sweeping statements on a blood-grouping technique—the Eldon card—without having tested it carefully in their own laboratories (Dr. R. A. Zeitlin, *Journal*, October 15, p. 970, and Dr. R. Drummond, *Journal*, December 3, p. 1388).

Impressed by the reports of Eldon[1] and Jordal,[2] we have been trying out the Eldon cards for the past six months, and are satisfied that this is a valuable addition to blood-grouping technique and particularly suitable for emergencies, small hospitals where transfusions are infrequent, and grouping large numbers of recruits, etc. The cards are processed commercially, thus eliminating errors in the manipulation of the reagents, and are individually sealed in moisture-proof packets. Each card is stamped with the serial number of the batch and an expiry date is given for two years after production. Dr. Zeitlin criticizes the lack of controls, but there is nothing to prevent one performing the usual serum check with A and B cells on the patient's serum in the ordinary way, and, since all the cards are issued with a serial number, using other cards of the same batch to check the activity of the reagents. The cards can be used either with capillary blood at the bedside or with a concentrated suspension in the laboratory.

Over the past six months we have tested the capillary blood of 70 people in parallel with the standard tube technique with only one discrepancy (discussed below). The cards were all of batch 00017 processed in June, 1955, and there has been no apparent diminution in activity, the agglutination being well developed within four minutes. Among these there were two groups of selected patients, 8 with an E.S.R. (Westergren) of over 100 mm./hour and 12 with haemoglobin levels below 50% (7.4 g.). The presence of high rouleaux forming principle did not interfere with the test at all, and the anaemic patients showed clear-cut reactions, though, as emphasized by Eldon, these are probably better grouped on venous blood in the laboratory. One of the anaemic patients showed a negative reaction with the anti-D panel with capillary blood and only a weak reaction with venous blood and was of type D^u.

Every hospital must decide on its own techniques for dealing with emergency transfusions, and there are many other methods which can be used in an emergency, but the Eldon card is instantaneously ready, needs no additional reagents, which if not often used may have lost potency or be contaminated, and only requires tap water and an intelligent person who will read and follow the simple instructions. The negativistic attitude of insistence on a four-hour grouping and compatibility test places all responsibility for a blood transfusion in less than that time on the clinician. The development of rapid and reliable methods in which ABO and D typed homologous blood will be available for emergencies should be encouraged; this would save O Rh negative blood and provide the patient with the minimal chance of immunization. In the Radcliffe Infirmary, on four occasions in the last two months the Eldon card has proved invaluable in cases of severe shock, and blood of the same ABO and Rh type as the patient has been transfused with the least possible delay.—I am, etc.,

Oxford. M. M. PICKLES.

REFERENCES

[1] Eldon, K., *Dan. med. Bull.*, 1955, 2, 33.
[2] Jordal, K., ibid., 1955, 2, 40.

Ban on Heroin

SIR,—The Government has decided, for legal reasons, to withdraw the ban on the manufacture of heroin, and it is suggested that the Medical Research Council will be asked to carry out controlled experiments concerning the value of this drug. Surely, Sir, there is urgent need for research, not only into the efficacy of one drug, but into all methods of relieving pain.

Pain is the most important symptom in the whole of human suffering, and yet to date very little systematic research has been carried out on the subject. Some years ago, possibly 15, a committee was set up by the then existing Clinical Cancer Research Committee of the British Empire Cancer Campaign, and had among its members Professor Adrian (now Lord Adrian), Professor Le Gros Clark, Dr. E. A. Carmichael, and many other distinguished people. The object was to organize research into the "alleviation of pain due to cancer in its advanced stages." Unfortunately the committee met only once, because the people who control the British Empire Cancer Campaign decided that this was not a fit subject on which to spend research money. Following this the Medical Research Council set up a small working party, which is, I understand, still doing essential work on the anatomical aspect of pain and the nerve pathways conducting pain impulse, but I am not aware how much practical clinical research is being carried out.

The difficulties of clinical research into the subject are very great, because pain is subjective. Much of the fear of cancer is due to the idea that every case ends by the patient suffering months of agony. If some assurance concerning the relief of pain, based on controlled experience, could be published it would do away with much mental suffering. It is time that much more money and energy should be *directly* spent on research into what some scientists regard as "merely a symptom."—I am, etc.,

Oxford. MALCOLM DONALDSON.

Organization for Major Disasters

SIR,—I am grateful to Mr. Richard Harrison for his letter (*Journal*, November 26, p. 1326) criticizing mine (*Journal*, November 5, p. 1144) on the organization for major disasters, because it exactly confirms the points I wished to make. First, and most important, he agrees with me that those who have had experience of these tragedies know that much could have been done by previous planning to deal more effectively with the casualties. Even at the Milton disaster, where the organization was so praised in Parliament (probably quite correctly), we read in *The Times* of November 21, "The Radcliffe Infirmary, Oxford, after admitting 50 cases, had to send the overflow to Battle Hospital, Reading, and other hospitals in the area." With proper planning beforehand this would not have happened, as the one in charge would have known the number of beds reasonably available and sent the cases direct to the most suitable hospital. In Cheshire, as the result of our Winsford disaster, every ambulance now carries an up-to-date list of the number of casualties every hospital can be expected to deal with, together with particulars of facilities for special types of injury. This is only one small facet of planning, but it is a very important one.

Mr. Harrison's letter convincingly proves my second point that "the lessons from the Harrow disaster" (on which unfortunately most of the government planning seems to be based) "may not apply all over the country." It comes out when he writes of the loss of a surgical registrar from a hospital not mattering much, which may be true of London, where they are thick on the ground. In the smaller hospitals, which are likely to be nearest to most accidents, the registrar is much more important and his absence would seriously cripple the staff, nor do I think that many surgeons would agree that, in these small hospitals anyhow, "resuscitation and dressing" could safely be left to "the anaesthetic and medical staff." It is obvious that hospitals must be ready to deal with such cases, and that their organization for this is the responsibility of the regional hospital boards, etc., and I said that these must come prominently into the picture; but that these bodies can organize a proper disaster service is, I think, an illusion based on too close attention to the Harrow experience. It overlooks those wide areas of the country where, as I said, hospital facilities are distant and hospitals relatively small. From the nature of the case disasters respect neither regional hospital nor county boundaries; two or more regions may be involved. If planning is to be done it must be on a national basis and by surgeons who are senior enough to discuss with and convince high regional officials, chief constables, and fire officers, and other

senior people. It is not the business of the doctor in charge to run the police or the fire service, but he must know how to work in with them and use the facilities which they alone can provide.

I realized that such surgeons would have to be available and also possess "a considerable degree of physical stamina and agility," which was why I specified police cars and a "fairly senior surgeon," for the older ones could not stand the strain and exposure. But no registrar could be expected to survey the wide areas of accident that are necessary for proper organization, nor could he call together the heads of the many services that might be involved to discuss the problems arising from a disaster at, for example, Lands End, the Peak District, or Killiecrankie. Yet it is only by such close and imaginative planning that disasters will be properly tackled. I imagine that it would need some 30 to 40 surgeons to get the service co-ordinated, and they would have to be seconded from their hospitals for about three months to do so, but after that it would be largely a matter of keeping things up to date, and themselves in readiness to go at a moment's notice. But it would be a fascinating as well as a responsible job, which was why I wrote, in words that you excised, it would be his duty "and privilege" to make himself familiar with the physical and medical geography of his area, etc. It would bring him into touch with many influential people, and in these emergencies it is the personal knowledge that one has of those responsible that makes the difference between a properly controlled operation and a hasty improvisation.

This letter is too long to reply to a few other points Mr. Harrison raises, but the matter is of the greatest importance if the public of this country is to get the treatment it has the right to expect when a disaster occurs. It also has obvious bearings on Civil Defence, but this tends to concentrate on towns and cities, while the greatest difficulties of a disaster service arise where there is no population at all. This makes it essential that it should not be organized as if the whole country were like Harrow, or as if the accidents always occurred within the boundaries of a hospital management committee. Congratulations in Parliament are all very well, but what is really needed is some hard planning and crucial decisions, and the disaster on November 20 shows how urgent the need is.—I am, etc.,

Winsford, Cheshire. W. N. LEAK.

SIR,—Dr. W. N. Leak will need considerably more support than his letter (*Journal*, November 5, p. 1144) has so far evoked if "the bureaucratic structure of our hospital service" is to be moved into such action as will improve the hospital treatment of *all* those injured by accidents. The problem for solution is not represented by occasional disasters. Each year, for the last 20 years, over 1¼ million injured have attended hospitals, and 10,000 have died in hospitals as the result of their injuries. There has been no lessening in these numbers. This is the problem. When this problem is adequately met, the organization for the occasional mass disaster will also be met.

A positive and progressive hospital treatment policy for all accidents is the only way to lessen our total annual mortality figures and to prevent permanent deformity following injury. As to the prevention of accidents, few really sound research studies of human conduct—the major cause of accidents—have been made. Yet it should be possible with research facilities at hospital level to collate from their records the details of the cause of the accident with the injuries sustained and their aftermaths.

Any review of recent advances in our knowledge of the body's reaction to severe injury and reports of modern advances in the treatment of injury[1] show quite clearly that medicine now has the knowledge and the ability substantially to decrease the present mortality and morbidity rates—and with a saving of time and money to the injured and to the community. From the fourteen years' experience of the "Birmingham experiment" it is also clear that any improvement in the hospital care of the injured depends upon the institution of a completely new tempo and quality of treatment services from all levels of hospital staff. It is no longer good enough for surgeons and their theatre staffs to be on call, they must be on duty. The same tempo of service is essential from the full diagnostic team, including the *x*-ray department and laboratory staff (mainly for safe blood-grouping). This tempo of service is essential for the whole 24 hours of each day. Such improved standards of hospital treatment for injuries can never be achieved while we continue to regard injuries as a minor hospital problem to be fitted "somehow" into the slower moving services. Yet this essential new standard cannot be achieved without a positive and progressive policy from the Ministry of Health, first by providing really modern facilities to replace our present out-dated casualty departments, and next by attracting staff at all levels to these new departments with opportunities within the accident service itself for promotion to the highest rank.

The cost of accidents to the community has recently—and I think reasonably—been assessed at £300m. a year.[2] The cost per accident treated at the Birmingham Accident Hospital is less than £6. If this latter figure is taken as a national index, the present hospital treatment costs of the 1,250,000 accidents received is less than £8m. each year. These must be approximate figures, yet they indicate that we could afford to substantially increase the cost of hospital treatment if—and all the available evidence is in favour of this supposition—we thereby decreased the total cost of accidents to the community and lowered the present mortality and morbidity figures. The expense of improving the hospital accident-treatment services could be considerably offset by developing large central departments. In the final development of a national accident service between 25 to 30 fully equipped and staffed units, each of 200 beds, and each strategically sited alongside a large general hospital—in the provinces preferably a teaching hospital—would assure the efficient treatment of all seriously injured in our country. A plan that would take at least 20 years for its full development—if a start was made now—at a capital cost over those years of £30m.

The Sutton Coldfield disaster gave evidence of the best type of team work in the care of injuries. Local general practitioners, police, and ambulance services were quickly at the scene and treated those who could be treated at the site. The local cottage hospital and its staff treated the next degree in severity of the injuries. All the really seriously injured, 12 in number, were transferred either direct from the accident site or via the cottage hospital to the Birmingham Accident Hospital, where the full hospital staff, already alerted, were standing by to receive them. This is a good example of "sharing the load."

The Birmingham experience over the past 14 years in the care of over 550,000 acutely injured has shown that the main principles behind a central accident centre are economically and clinically sound, and that they work in practice. Yet the Birmingham experiment *must* ultimately fail if it is not given solid support from the Ministry of Health, both to improve its long out-dated facilities and to attract essential staff. Should it fail, the full development of accident services in this country will be considerably delayed. It is of interest to record that the foundation of the Birmingham Accident Hospital in 1941 was the direct outcome of the report and the recommendations of the Government's Interdepartmental Committee of 1939.

Hospitals charged with the care of all serious injuries must not only seek to develop and advance surgical treatment, but to match it with industrial and social resettlement. Indeed, when the total commitments of a national accident service are reviewed it is clear that not only is a new type of hospital service and staff essential, but equally important to development is a progressive executive hospital administration, primarily interested in solving this very tough yet solvable social problem. Therefore I entirely agree with Dr. Leak that the present regional boards and hospital management committees have not the time, nor the interest, to solve this particular problem. Yet there are many men and women in our country, particularly from industry and the trade unions, who would serve on the essential committees of management, as indeed was proved at the foundation and first seven years of the development of the Birmingham Centre.—I am, etc.,

Birmingham. WILLIAM GISSANE.

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2 Tuckwell, F. I., speaking at the National Joint Industrial Council for the Rubber Manufacturing Industry's conference, November 16-17, 1955, London.

Autogenous Vaccines in Asthma

SIR,—Diverse autogenous bacterial vaccines have been used by us for many years in the treatment of bronchial asthma. More than two-thirds of our cases have belonged to the endogenous allergic type of the disease. Our method was published several times.[1 2] In our opinion, vaccine therapy is the basis of the causal therapy in infective asthma (intrinsic asthma, endogenous asthma). Therefore I read with great attention the valuable and interesting communication of Drs. A. W. Frankland, W. Howard Hughes, and R. H. Gorrill (*Journal*, October 15, p. 941). According to the final overall results reported in the paper 58% of the cases showed improvement on the autogenous vaccines, while in the control group 52% showed a similar improvement on the carbol-saline injections. Thus it would seem to appear that the autogenous vaccines are a kind of non-specific therapeutic procedure.

In our opinion the use of carbol-saline solutions as a control might give rise to certain troubles in the assessment of the therapeutic value of both methods. It is well known that the carbol solution, which in this case refers without any doubt to a 0.5% phenol solution, cannot be considered as a simple control. The antihistaminic effect of carbol solutions is well known. Similar trials have been repeatedly described in the literature,[3] and we ourselves have also been able to confirm in a large number of cases that in allergic diseases transitional and even prolonged improvement could be obtained on the 0.5% carbol solutions.

Bearing this in mind, we may draw the conclusion that a control improvement based on a figure of 52% does not support some kind of placebo effect but might be traced back to the carbol as antihistaminic agent, which in this way would correspond to one of the effective forms of the non-specific, symptomatic asthma therapy.—I am, etc.,

Budapest, Hungary. K. HAJÓS.

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3 Barroso, C., *J. Amer. med. Ass.*, 1947, **134**, 313.

Reserpine and Rauwolfia in Psychoneuroses

SIR,—Drs. A. Folkson and A. R. May (*Journal*, November 5, p. 1121) have been fortunate in their freedom from side-effects during treatment with reserpine. Asthma of fairly severe type has been noted in 4 cases in a series of 150, some of which are reported elsewhere.[1]

Case 1.—Male, 35, phobic obsessional state, good physique but wide subcostal angle, dosage 1 mg. daily. During the third week he complained of dyspnoea on effort, and he was noted to be using his accessory muscles of respiration at rest. *Case 2.*—Male, 57, hysteria, pulmonary fibrosis due to old healed tubercle, 5 mg. reserpine given intramuscularly mane. Respiratory embarrassment so severe that treatment terminated on fourth morning. *Case 3.*—Female, 61, dementia, chronic bronchitis with emphysema. 1 mg. reserpine orally produced, within four hours, a typical moderately severe attack of asthma. *Case 4.*—Male, 51, acute mania, history of recurrent respiratory infection, wide subcostal angle. 5 mg. reserpine given intramuscularly and three hours later patient was dysphasic, dyspnoeic, and cyanosed.

In each of these cases auscultatory signs were typical of asthma. All were cyanosed, though to varying degree. Pulse volumes were good, and no catastrophic drop in blood pressure occurred. In fact, cardiac output and peripheral circulation were adjudged good.[2]

If one accepts the theory that reserpine is a parasympathetic potentiator,[3] then a certain amount of bronchospasm is hardly remarkable. Recent work by Bien[4] shows that reserpine inhibits the CO_2 augmentation of respiration though vagal reflexes are unaffected. Hollister *et al.*[5] report one case out of 127, and Vakil[6] notes only two cases in a series of several thousand, but his view that this was an allergic reaction is almost certainly too naive. Doyle and Smirke,[7] using very large doses, list a number of side-effects as prohibitive, but do not include asthma.

Since asthma itself is an illness associated with much anxiety, Segal, Earl, and Attinger[8] used reserpine in an attempt to "tranquillize" asthmatics, but in fact they found that it produced a reduction in timed vital capacity, and increased mechanical resistance to inspiratory and expiratory air-flow. Now that quite large doses are commonly used for the relief of psychiatric symptoms, it would seem advisable to proceed circumspectly in dealing with patients who have a history of chronic bronchitis or asthma. It may perhaps be significant that the four cases noted above were cyclothymes.—I am, etc.,

Newcastle-upon-Tyne, 3. R. S. FERGUSON.

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7 Doyle, A. E., and Smirk, F. H., *Practitioner*, 1955, **174**, 135.
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Intra-arterial Thiopentone

SIR,—The report by Dr. Peter Stuart (*Journal*, November 26, p. 1308) of a case in which thiopentone was given into an artery by accident prompts me to record the three occasions on which I have inadvertently given such injections—a 5% solution having been used in each case.

The first case was that of an elderly man: 4 ml. had been injected very slowly, when he suddenly shouted, and almost simultaneously blanching of the forearm was observed. The syringe was changed for one containing 1% procaine, of which 10 ml. was injected. Immediately after, 10 ml. 5% thiopentone was injected intravenously. Blanching of the skin persisted for an hour or two, but after regaining consciousness the patient made no complaint.

After this experience, when giving thiopentone into the veins in the antecubital fossa, I adopted the routine of injecting 2 ml. and then pausing. This resulted in a similar experience to that recorded above, but 50 mg. tolazoline was given instead of procaine, and blanching of the skin lasted only a few minutes. Intravenous thiopentone was given immediately after the intra-arterial tolazoline and there was no sequel. In view of this misadventure I took to giving 1 ml. 5% thiopentone, and then pausing, and I was practising this technique when I gave 10 ml. intra-arterially. Pain was not severe, and loss of consciousness occurred in less than a minute. As soon as the thumb was removed from the plunger the syringe filled with blood. While waiting for a syringe to be loaded with 50 mg. tolazoline (from 10 mg. ampoules), 20 ml. normal saline was injected into the artery, and this was very soon followed by 50 mg. tolazoline in 1% solution. When the patient recovered consciousness he made no complaint and there was no sequel.

My conclusions are that a test dose of 2 ml. should be given with a safety pause, as advocated by Dr. Stuart; 1 ml. appears to be insufficient. Also there is advantage in giving tolazoline immediately, and that this should be available whenever thiopentone is given intravenously. There would also appear to be a case for using veins on the dorsum of the hand, wrist, or foot as a routine.—I am, etc.,

Guernsey. BRIAN WEBBER.

Skin Necrosis Following Intravenous Noradrenaline

SIR,—We have read the article on skin necrosis following intravenous injection of noradrenaline (Mr. J. Humphreys, Mr. J. H. Johnston, and Dr. J. C. Richardson, *Journal*, November 19, p. 1250). The fact that more and more such cases are published in medical journals, and that intravenous noradrenaline is used more frequently, incites us to relate a simple method avoiding these accidents.

In a patient undergoing noradrenaline therapy, in which a white area of ischaemia is noticed close to the point of injection, the vasoconstricted area must be immediately infiltrated subcutaneously with 100 to 200 mg. of acetyl-

choline, using a fine needle and injecting at five to six different points. The results are almost immediate: the skin becomes pink and warm, and non-infiltrated areas are readily noticed and treated. By this method we have been able to avoid completely necrosis of the skin in four cases, whereas two cases in which the treatment was not applied developed an important necrotized area, very painful and healing slowly.—We are, etc.,

A. HAENNI.
E. C. BONARD.

Geneva.

Chlorpromazine and Jaundice

SIR,—I thank Dr. Bernard Isaacs and his colleagues (*Journal*, December 10, p. 1447) for making clear their position. I now realize that they are postulating a new syndrome in chlorpromazine jaundice: a few doses of the drug in conjunction with the unknown factor or factors presented by the concomitant disease lead to jaundice of potentially severe type on the 4th day or shortly after. The only syndrome familiar to me is of a later, usually milder, jaundice: Lomas *et al.*[1] (11 cases) on 16th to 25th day; Stacey *et al.*[2] (8 cases) 16th to 21st day; Cohen and Archer[3] (5 cases) "approximately 3 weeks"; but Moyer,[4] quoting Kelsey, Moyer, Brown, and Bennett (20 cases) includes one arising on the 5th day.

It is easy, but not necessarily accurate, to dismiss these precocious jaundices as the result of coincidental disease or previous sensitization to the drug, and I cannot dispute the possibility that Isaacs *et al.* have come upon a new chlorpromazine-jaundice syndrome. I know nothing of statistics, but it appears to me that, by virtue of the several foreseeable variables in the concomitant or associated diseases necessarily present in their cases, the field they will be obliged to cover in order scientifically to establish it must be extensive.

I am happy to end on a further note of agreement, for implicit in Boardman[5] and Lomas *et al.*[1] are the suggestions that there are contraindications to the drug in passive congestion of the liver and other pathological conditions of this organ.—I am, etc.,

R. H. BOARDMAN.

London, S.W.1.

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5 Boardman, R. H., *British Medical Journal*, 1954, **2**, 579.

"Kissing Spines"

SIR,—Low back pain due to some gross lesion can in most cases be correctly diagnosed when properly investigated in a specialist department. A heterogeneous group of cases remain in which the diagnosis often seems to depend more on the physician consulted than on any clear-cut clinical criteria, and there is a danger that too many may be labelled "functional." Some undoubtedly are, but increasing interest in the problem has led to the separation of several distinct groups.

Drs. Philippe Bauwens and Anthony B. Coyer (*Journal*, November 26, p. 1306) have therefore helped to clarify a most difficult problem by their description of the multifidus triangle syndrome. One of the main findings in these cases is pain which is increased on lumbar spine extension, and confusion may arise when "kissing spines" are encountered. "Kissing" may occur between any two lumbar spines or between the spines L.5/S.1. In the paper by Steindler and Luck,[1] to which reference is made in the above article, a case is described under the rather clumsy title, "Supraspinous and Inter-spinous Ligament Syndrome." Eventually operation was performed in which the impinging points of the spines of L.4 and L.5 were excised.

Important points in the diagnosis are the fact that pain is generally sharply localized in the midline. Tenderness is often elicited over the inter-spinous ligament and pain is reproduced on lumbar spine extension, but on no other movement whatsoever. Sometimes the spines can be felt in apposition with the spine extended. Radiologically the diagnosis may be confirmed by the finding of sclerosis and irregularity of the adjacent surfaces of the spines, or (as in a recent case) irregularity on the upper surface of the spine of S.1 on which the tip of L.5 spine impinged.

Trauma may play a part in the aetiology, but the main factor is an increase in the normal lumbar lordosis. Procaine injections into the inter-spinous ligament are useful diagnostically, but give only temporary relief unless the associated lordotic curve is corrected. Recognition of the condition is not difficult, and treatment along these lines gives most satisfactory results in a condition which may cause quite severe disability.—I am, etc.,

R. W. BARTER.

London, W.C.1.

REFERENCE

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Value of Steam Tent

SIR,—Whilst attempting to overcome the difficulties of creating various climatic conditions in the laboratory, I became curious as to the efficiency of the technique of air-conditioning employed on the ward for therapeutic purposes.

Some weeks ago, advantage was taken of the opportunity to measure temperature and humidity of the air in a steam tent occupied by an unconscious patient. A thermometer and hygrometer were suspended above the patient's face and readings were taken at frequent intervals throughout the 24 hours during a period of several days. Readings were also taken with instruments hanging in the ward at a distance of several feet from the patient for a similar period. The readings obtained at these two situations were very similar and on many occasions identical. Both varied in temperature from 65°–75° F. (18°–24° C.) and in relative humidity from 50%–75%. These results may appear somewhat surprising in view of the traditional benefits of the steam tent. The measuring instruments were returned to the makers, who found them to be reliable on recalibration.

I would be grateful for any views your readers may have on the usefulness of the steam tent, since, apart from the inconvenience of this somewhat cumbersome contraption, the proximity of the steam kettle is not entirely without danger to the patient and to the ward staff.—I am, etc.,

PHILIP COLE.

Manchester, 13.

Testimony of Physical Men

SIR,—John Hunter must have turned in his grave when the society founded in his memory carried a motion to retain the death penalty (*Journal*, December 3, p. 1384). "A poor devil," he said, "was lately hanged at Warwick upon no other testimony than that of physical men whose first experiments were made on this occasion." He referred to Captain Donellan, hanged for murdering his brother-in-law, Sir Theodosius Boughton.

I have recently read the verbatim report of this trial, and I agree with Hunter that the evidence was insufficient, for, as he pointed out, neither the brain nor the intestines were examined. The Hunterian Society could have a first-class debate re-trying Captain Donellan, and I am sure he would be acquitted, John Hunter would be proved the only witness whose evidence bore cross-examination, and the Lord Chancellor who said in 1948 that no man not guilty of murder had been hanged might change his mind.—I am, etc.,

R. E. SMITH.

Rugby.

Acute Abdomen in Children

SIR,—Dr. John F. Hickey asks (*Journal*, December 3, p. 1392), "Why use the word laparotomy, which suggests a paramedian incision?" On the contrary, why not? λαπάρα, according to Liddell and Scott, is "the soft part of the body between ribs and hip, the flank." The Latin equivalent of the plural is given as "ilia," so what better word could one coin for an incision in the iliac fossa?—I am, etc.,

MICHAEL REILLY.

Plymouth.

Spasticity in Infants

SIR,—I see from Dr. G. Stuart Robertson's letter (*Journal*, December 3, p. 1390) that the school health service is now responsible for the treatment of these children. I had thought that the general practitioner was responsible for the treatment of his patients, but no doubt I am too old-fashioned.—I am, etc.,

Exeter. N. S. ALCOCK.

Acute Phlegmonous Caecitis

SIR,—Until I read Mr. F. Baar's account (*Journal*, October 15, p. 948) of it, I had not heard of this condition. However, it may be of some medico-legal importance. Heavy damages were awarded not very long ago to the representatives of a man who died of a very similar illness, attributed to a kick from a horse 18 days previously.[1] The casualty officer was found to be negligent in failing to diagnose the condition a fortnight before it developed.

I suggest, Sir, that knowledge of the existence of this syndrome on the part of those concerned, including the professional witness, might have led to a very different verdict being returned. As it is not described in standard textbooks, I hope I may be excused for supposing that learned counsel knew as little about the syndrome as I did.—I am, etc.,

Shipley, Yorks. HENRY STEWART RUSSELL.

REFERENCE

[1] *British Medical Journal*, 1953, **1**, 166.

Hysterical Abdominal Proptosis

SIR,—I would agree with the comments by Dr. R. W. Crocket (*Journal*, December 3, p. 1390), and would add that they may well be applied to earlier reports on cases designated as suffering from "hysterical abdominal proptosis." The symptom of non-gaseous abdominal proptosis may be part of a syndrome, but there is little positive evidence, if any, for calling it "hysterical." The fruitless search for an organic cause in no way compensates for the lack of positive evidence for this diagnosis. If the diagnosis of hysteria, with more psychiatric justification, is made, this still does not protect the patient from subsequent or coincident organic disorder or the physician from the responsibility of looking for it. The danger of over-investigation of these cases is far less than the danger of neglecting to do so, and it may be that follow-up studies and full psychiatric assessment of such cases will be more illuminating than the descriptions so far given.—I am, etc.,

London, S.W.2. LAWRENCE GOLDIE.

Extra-abdominal Herniation of Bowel

SIR,—I have read with interest the description of a case of congenital extra-abdominal herniation of bowel by Dr. Gerald M. Lurie (*Journal*, October 15, p. 951). I have seen a similar but even more unusual case recently, and the details are given below.

I was called to see a newborn infant which was reported to have a large lump attached to the abdomen. It was the first-born female baby of a young mother aged about 17. It was active and crying lustily. The umbilical cord was normal in appearance and attachment and had not been separated from the placenta. A large chocolate-coloured mass was found lying over the abdomen just below the umbilicus. On closer examination it was found to consist of some loops of ileum, the caecum, ascending colon, and the right lobe of the liver with the gall-bladder. On lifting the mass a little it was found that there was a large defect in the middle of the lower abdomen, extending from just below the umbilicus to the pubic region. The mass had no covering of parietal peritoneum and no hernial sac was seen.

As no expert surgical aid was available in this small place nothing could be done to save the infant and it died the next morning.—I am, etc.,

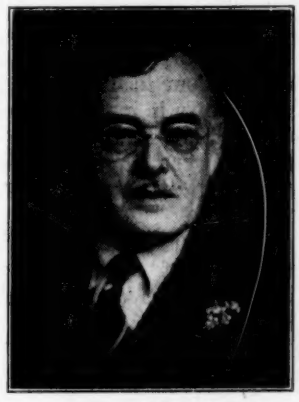
Ahmednagar, India. U. G. MASURKAR.

Obituary

P. A. BUXTON, C.M.G., M.R.C.S., D.T.M.&H., F.R.S.

We record with regret the death on December 13 of Professor P. A. Buxton at the age of 63. One of the leading medical entomologists of his time, he had been director of the department of entomology at the London School of Hygiene and Tropical Medicine since 1926. Many improvements in tropical hygiene owe much to his studies of disease-transmitting insects.

Patrick Alfred Buxton was born on March 24, 1892, the eldest son of Mr. A. F. Buxton, who later became chairman of the London County Council. His mother before her marriage was Miss Violet Jex-Blake, daughter of a headmaster of Rugby School, where Patrick Buxton was educated. From Rugby he went on to Trinity College, Cambridge, where he obtained first-class honours in both parts of the Natural Sciences Tripos. Continuing his medical training at St. George's Hospital, he took the Conjoint qualification in 1917. For five years, from 1916 to 1921, he was a Fellow of Trinity College, but for nearly half that time he was on war service as an entomologist in Mesopotamia and north-west Persia. From 1920 to 1921 he was demonstrator in the zoology department at Cambridge, which he left to become entomologist to the Palestine Government. Just before this he had taken the D.T.M.&H. of Cambridge. His book, *Animal Life in Deserts*, was published in 1923. In the same year he was appointed leader of the expedition sent out by the School of Tropical Medicine in London to the South Pacific. His studies there were later published under the title *Researches in Polynesia and Melanesia*, and some years later he wrote a book for the British Museum of Natural History about the insects of Samoa. On his return to England in 1926 he joined the staff of the London School of Hygiene and Tropical Medicine as director of the department of medical entomology, and shortly afterwards was appointed to a university readership tenable at the School. He became professor of medical entomology in the University of London in 1933.



[*Walter Stoneman*

Much of Buxton's work was concerned with the effects of climate on insects which transmit disease: he investigated also the conditions in which they multiply and the measures which must accordingly be taken to control them. He made many expeditions to tropical Africa and other countries, and published the results of his researches in numerous papers and in a monograph on *Trypanosomiasis in Eastern Africa*. His book, *The Natural History of Tsetse Flies*, was published earlier this year: it is likely to remain the standard work on the subject for many years to come. Among other insects studied by Buxton were the flea and the louse. The practical application of the knowledge thus gained lay in the fields of preventive medicine. Without

Buxton's work it would have been far more difficult to avoid a repetition of the epidemics of typhus and relapsing fever which occurred at the end of the first world war. His monograph on *The Louse* was first published in 1939. During the second world war he worked in close association with Government and Service departments, being particularly concerned with the development of D.D.T. as an insecticide.

Buxton was elected F.R.S. in 1943 and appointed C.M.G. in 1947. A member of the Medical Research Council from 1946 to 1949, he was also a member of the Colonial Medical Research Committee. In 1949 the Liverpool School of Tropical Medicine awarded him the Mary Kingsley Medal, and in 1953 he received the Linnean Medal. Earlier this year he gave the Founders' Memorial Lecture at Girton College, Cambridge, and he had recently been appointed Heath Clark Lecturer for 1956. His presidency of the Royal Entomological Society was interrupted in 1942, when he had to go to India on urgent war work, and he served a second term as president in 1953 and 1954. Professor Buxton was well known in many parts of the world as an ambassador of tropical medicine; he was always ready to help field workers in the Tropics with their problems, and they will miss the encouragement which his visits gave them.

Professor Buxton married Muryell Gladys, fourth daughter of the Rev. Hon. W. Talbot Rice. They had two sons and four daughters, but one son died in 1952.

D. S. B. writes: When Patrick Buxton chose, early in his life, to couple his enthusiasm for natural history with the disciplines of scientific research the enduring advantage was to be to entomology as a whole, besides to the medical field implicit in his appointments. Throughout thirty years as director of research in medical entomology at the London School of Hygiene and Tropical Medicine he continuously initiated by his own outstanding contributions, and those of colleagues he had ably chosen, fundamental research of wide significance. In particular he studied medically important arthropods: their systematics, environments, physiology, biology, and their control were subjects which knew over the years the stimulus of his inspiration and intellectual energy. Latterly, with these foundations firmly laid, he turned to encourage research with arthropods in relation to the pathogens they transmit and the development of the biochemistry of insects; his hobby had become insects associated with fungi—a field in which he soon contributed many original observations. His scientific papers were numerous, varied in topic, and fundamental. One of his earliest works, *Animal Life in the Desert*, published some 40 years ago, was recently reprinted to meet recurring demands. His last major work, *The Natural History of Tsetse Flies*, appeared in May of this year. It is fitting to his memory that his working life should be spanned by books owing their inception to his urge to understand as well as to enjoy Nature and her ways.

Buxton's reputation for scientific integrity and accomplishment was world-wide. It could have stemmed alone from his writings, but he had also travelled widely, from the subarctic to the Tropics, ever since his early, productive sojourns in the Near and Far East. He had an easy manner as a teacher, and many will recall the conversational ease and humour of his lectures. In discussion and in committee he was a vigorous advocate of what he felt to be right. In criticism he could be quizzical, sharp, and sometimes caustic; the compelling force was his desire for facts. In later years he mellowed. Time may have played its part, but surely it was also true that he had succeeded, by his endeavours and example, in raising the standards of inquiry and appraisal in his subject, in the furtherance of which he had never spared himself.

Those of us who have been in his department as staff or research students remember his breadth of scholarship, the enlightened balance he achieved between direction and freedom in research and administration, and the soundness of his judgment. But there was much that went deeper than all this. Through his department and by personal hospitality Buxton fostered a spirit of reciprocal respect among men and women of many races and tongues, and an understanding of affairs wider than those of science itself. Many throughout the world will think of him in this way at this time.

A. EGAS MONIZ, M.D.

Professor Egas Moniz, a neurologist and neurosurgeon of international renown and a former Foreign Minister of Portugal, died in Lisbon on December 13 at the age of 81. He was awarded the Nobel prize for medicine in 1949.

António Caetano de Abreu Freire Egas Moniz was born at Avanca on November 29, 1874: he was given his last two names after Egas Moniz de Ribadouro, who lived in the twelfth century and was tutor to Portugal's first king. After studying at the University of Coimbra, Egas Moniz graduated in medicine in 1899 and continued there as a teacher, becoming deputy professor of medicine in 1902. Meanwhile his political career had already begun in 1900 when he was elected deputy for Estarreja. He was a member of the Portuguese parliament at various times during the next sixteen years, but in 1908 he served a short term in prison for his part in an abortive revolutionary movement. In 1918 he was appointed Portuguese Minister at Madrid, but returned to Lisbon at the end of that year to become Minister of Foreign Affairs, leading the Portuguese delegation to the Peace Conference at Versailles in 1919. During the same year he fought a duel after a political quarrel and not long afterwards abandoned politics, although as late as 1951 he was asked to accept nomination as President of his country, but he had to decline this for health reasons.

Though preoccupied with politics all these years, Egas Moniz did not forsake medicine. He continued his teaching at the University of Coimbra and began to specialize in neurology, visiting Paris and Bordeaux to study under Babinski, Pierre Marie, Dejerine, and Sicard. In 1911 he accepted the newly created chair of neurology at the University of Lisbon, which he occupied until 1945. He was also in charge of the neurological department at Santa Marta Hospital. During the first world war he published a monograph on the subject of neurology in war. In 1926 he began the experiments which culminated a year later in the introduction of cerebral angiography. He first announced his achievement to the Société Neurologique de Paris in July, 1927, and recorded it in the *Revue Neurologique* the same year. He later published two monographs on the subject: *Diagnostic des tumeurs cérébrales et épreuve de l'encéphalographie artérielle* (1931) and *L'angiographie cérébrale* (1934). These outlined the value of the method

in the investigation of cerebral tumours and other intracranial lesions. During the next ten years he published, alone or with colleagues, over 100 papers on this subject.

Egas Moniz had long been concerned about the ineffectiveness of medical treatment in psychoses. He was not the first to think along surgical lines. As long ago as 1890 Burckhardt, a Swiss alienist, had seen good results follow the removal of part of the cortex of the brain in the temporo-parietal region in one of four psychotic patients on whom this operation was performed. In 1935 Egas Moniz was attending an international conference in London, and he heard C. F. Jacobsen describe his work with Fulton on the effect of removing part of the frontal lobe in chimpanzees. For some years before this he had been engaged on research into possible methods of treating mental disorder, and on his return to Lisbon he decided to try the effect of severing certain fibres in the anterior part of the frontal lobe. He called this operation prefrontal leucotomy, the technique of which he worked out with his colleague Almeida Lima. In 1936 he described the method and early results in *Tentatives opératoires dans le Traitement de certaines Psychoses*. His operation or the American modification, prefrontal lobotomy, devised by Freeman and Watts has been used with success by neurosurgeons in all parts of the world, though "psychosurgery" remains a subject of controversy. Whether or not leucotomy is entirely superseded by other therapeutic methods, the operation gave a powerful impetus to research into the treatment of mental disorders. In Lisbon an Egas Moniz study centre has been established to undertake neurosurgical and psychiatric research. In 1949 Egas Moniz was awarded the Nobel Prize for Physiology and Medicine jointly with Professor W. R. Hess.

Egas Moniz accomplished his most important medical work between the ages of 50 and 65. He continued to practise neurology in Lisbon until quite recently. Some years ago he was shot in the chest by a psychotic patient, but this only caused a brief interruption in his work. A man of many interests, he was an authority on the history of playing-cards, an essayist of distinction, and he wrote a number of biographies, including a life of John XXI (Petrus Hispanus), the only medical man to become Pope. He was a member (and at one time president) of the Royal Academy of Sciences of Lisbon and of many other scientific societies. The Section of Neurology of the Royal Society of Medicine elected him to honorary membership in 1941.

T. B. DAVIE, M.D., F.R.C.P.

Dr. T. B. Davie, principal and vice-chancellor of the University of Capetown and formerly professor of pathology at the University of Liverpool, died in London on December 14. He was 60 years of age.

Thomas Benjamin Davie, who was born on November 23, 1895, was brought up in South Africa. He graduated B.A., with honours in chemistry, at the University of Stellenbosch in 1914 and later served as an officer in the Royal Air Force. On his return to South Africa he became a schoolmaster, teaching science in a number of high schools, including the Parktown Boys' High School, Johannesburg. During the disturbances in Johannesburg in 1922 he was badly wounded while serving with the Transvaal Scottish Regiment. In 1924 Davie became a medical student at Liverpool University, where he had a most distinguished career. He held the Holt Fellowship in physiology in 1926–7; he won the O. T. Williams prize and the Mitchell, Banks, Torr, Holt, and Kanthack medals, as well as the medal in forensic medicine and public health; and he was a university scholar and exhibitioner. Graduating M.B., Ch.B. with first-class honours in 1928, he proceeded to the M.D. in 1931 and took the M.R.C.P. in the same year. After graduation he held the posts of resident house-surgeon and house-physician at Liverpool Royal Infirmary. He became junior lecturer in pathology at Liverpool University in 1929, and four years later he was appointed senior lecturer. Meanwhile he held the post of pathologist to the City Hospital, Walton. In 1935 he was elected to the chair of pathology at Bristol University, but three years later he returned to Liverpool to succeed Professor J. H. Dible in the George Holt chair of pathology. Among the hospitals which he served as honorary pathologist were the Royal Infirmary, the Maternity and Women's Hospitals, and the Royal Liverpool Children's Hospital. In 1940 he was elected F.R.C.P. Davie remained in the professorial chair until 1946, when he was appointed the first full-time dean of the faculty of medicine at Liverpool, thus being given the responsibility for much of the detailed planning of the projected post-war developments in the Liverpool medical school. His great skill as an administrator made him an admirable choice for this work, but within two years an even more important post was offered to him, that of principal and vice-chancellor of the University of Capetown.

In 1948 he returned to South Africa with an established reputation as a medical scientist and as an educationist, and he was an immediate success in his new career. In Capetown as in Liverpool he was very popular with the students, and his influence extended far beyond the university. He faced political difficulties and protracted ill-health with courage, and the leading position he occupied in Capetown was well earned.

Davie was an exceptionally capable teacher, and his demonstrations in the post-mortem room at the Liverpool Royal Infirmary were renowned. Together with Professor J. H. Dible, he wrote a *Textbook of Pathology* which was published in 1939, and during the second world war he published a paper on the pathology of T.N.T. poisoning. He was appointed director of the regional blood transfusion service in the Liverpool area and carried out his duties with great efficiency. The United States Medal of Freedom was awarded to him for his services to the U.S. Forces. After the war he was a member for a short time of the Liverpool and Welsh Regional Boards. In 1948 the University of Cambridge conferred on him the honorary degree of LL.D.

Though his health had not been good for some time past, Dr. Davie came to England a few weeks ago to represent the University of Capetown at the installation of the Queen Mother as Chancellor of the University of

London. He died in a London hospital, being survived by his widow, formerly Miss Vera C. Roper, whom he married in 1921.

We are indebted to Professor H. L. SHEEHAN for the following appreciation: Not infrequently someone who is already established in another profession decides several years later to take up medicine instead. A man requires great ability and determination to make a success of this change Davie was such a man. After serving in the first war he had been science master in schools in South Africa for five years before he came to this country to begin his medical studies at the age of 29. With an excellent brain and an enormous capacity for hard work he passed brilliantly through the medical course, and within seven years after qualifying had reached his first chair in pathology. He had not been long in Bristol before he was called back to occupy the chair at Liverpool.

He had very great gifts as a teacher. To clarity of exposition he added enthusiasm and the ability to rouse it in others, so that the voluntary tutorials he gave always packed the lecture theatre. His writings on pathology were of the same high standard. During the last war other responsibilities fell on him—the organization of the local blood-transfusion service, the part-time deanship of the medical school at Liverpool, and so on. Soon it became obvious that he was outstanding in the administrative field also. His plans were far-seeing but also realistic, he was excellent on committees, and he could be trusted completely. At the end of the war he was persuaded to become the first full-time dean of the medical school. There were many difficult problems in getting the medical school back to a peacetime footing and in catering for the large numbers of young men coming back from the Services. He handled them all with the success that was expected of him.

Towards the end of 1947 he was invited to go to Capetown as principal and vice-chancellor of the university there. It was delightful to see the enthusiasm with which he looked forward to returning to his native land and to applying himself to the great responsibility of the post there. He sailed for South Africa with happiness and eagerness and loaded with the good wishes of everyone who had known him in Liverpool. Then came disaster. No sooner had he landed in South Africa than he developed a severe generalized rheumatoid arthritis. Within a few weeks every joint and every bursa was attacked, and he was reduced from an active, vital man to a cripple. For the rest of his life the disease progressed steadily and he was never free from pain. As if this were not enough, he had an additional serious illness almost every year: a perforation, a pulmonary embolism, a gastrectomy, and so on. Any normal man would have abandoned work in the face of such a series of troubles, but it was during these last seven years that Davie's character really showed itself. The greater the difficulty, the greater the determination with which he faced it. Despite the fact that he could only walk with difficulty and had to be helped into or out of his chair, he worked as hard as ever on the affairs of his university and for the progress of education in general. If this involved travelling long distances, he undertook the journey, though it was obvious torture to him.

Handicapped from the start of his vice-chancellorship in this way, Davie had also to face particular difficulties in Capetown. A new vice-chancellor has to learn about and then look after the affairs of the whole university, not only of one faculty; this in itself is sufficient work for any man of exceptional abilities. But in addition Davie arrived in South Africa in time to meet great political upheavals, which had inevitable repercussions on the university. He felt it his duty to maintain the freedom of academic life and to prevent any political interference with the constitution of the university, and fought steadily for these two principles in the face of considerable opposition right up to the time of his death.

It had been planned to give him the honorary degree of LL.D. at his Alma Mater this month, but his last illness caused the postponement of the ceremony. There is no doubt that this would have been one of the most popular honorary degrees that Liverpool University has proposed. Most men of brilliant intellect and enthusiastic character do make some enemies, but Davie made only friends. The reason is that he was completely honest and sincere. Any minor mistakes that he made were due to an excess of kindness towards the underdog. His courage in the face of his disabilities during the last seven years was only matched by his cheerfulness and by a complete absence of that self-absorption usually induced by continued ill-health. He was an inspiration and an example to those of us who had the privilege of knowing him.

The sympathies of all his friends go to his very gallant wife, who was an ideal partner to him in the good times and a constant support to him during his illness.

L. V. CARGILL, F.R.C.S.

We record with regret the death on December 13 of Mr. L. V. Cargill, emeritus lecturer in ophthalmology in King's College Hospital Medical School and consulting ophthalmic surgeon to King's College Hospital and to the Royal Eye Hospital. He was 89 years of age.

Lionel Vernon Cargill was born on June 27, 1866, and was educated at King's College School, Wimbledon. In 1884 he gained the Salter's university exhibition and became a medical student at King's College, where he had a brilliant record. He was awarded the Sambrooke exhibition in 1885 and, in the following year, the junior medical scholarship, the Carter gold medal and prize for botany, the Leathes prize, and the Barry prize for divinity. To this already impressive list of prizes he added the second-year scholarship and the prize for materia medica and, in 1888, the Todd prize for clinical medicine and prizes for obstetrics, pathological anatomy, and forensic medicine. In 1889 he became senior scholar of his year and obtained Sir Joseph Lister's clinical surgery prize.

After passing the intermediate M.B. examination at London University at the end of his second year, he was appointed assistant demonstrator of physiology at King's College. In 1890 he took the London Conjoint diploma and the L.S.A. and was appointed ophthalmic clinical assistant to M. M. McHardy, then professor of ophthalmology at King's College and ophthalmic surgeon at King's College Hospital; it was mainly through McHardy's encouragement and advice that Cargill decided to devote himself to the study and practice of ophthalmology. Appointed house-surgeon to Lord Lister in 1890, Cargill obtained the F.R.C.S. in 1892, and in the following year became the first house-surgeon and surgical registrar at the Royal Eye Hospital, where for some time previously he had been a clinical assistant. In 1894 he became Sambrooke surgical registrar at King's, and two years later was appointed assistant surgeon at the Royal Eye Hospital and assistant ophthalmic surgeon at King's College Hospital.

In due course he became senior ophthalmic surgeon at both hospitals. He was also on the staff of the Seamen's Hospital, Greenwich, and the Plaistow Maternity Hospital. Cargill served in the war in South Africa as an ophthalmic surgeon to the Imperial Yeomanry hospitals, receiving the medal and three clasps. He wrote a description, published in the *Journal* in 1901, of ophthalmic conditions resulting from modern gun-shot wounds. In the first world war he was honorary consultant for diseases of the eye to military hospitals in London and was in charge of the ophthalmic cases at the 4th London General Hospital. Cargill was an examiner in ophthalmology at Oxford University and a former member of the council of the Ophthalmological Society of the

United Kingdom and of the Oxford Ophthalmological Congress. When the B.M.A. held its Annual Meeting at Cardiff in 1928 he was vice-president of the Section of Ophthalmology and held similar office at the Winnipeg Meeting in 1930. In the latter year he attended the annual meeting of the Pacific Coast Oto-ophthalmological Society at Victoria, British Columbia, and represented King's College Hospital Medical School at the formal opening of the Banting Institute in the University of Toronto.

Cargill was devoted to his own medical school and took an active part in its affairs for very many years. At King's College he was president of the medical society in 1902–3, and at King's College Hospital he held office as honorary secretary and treasurer and, later, president of the Clubs and Societies Union. He was also treasurer of the King's College Hospital war memorial fund. When he retired from the active staff of the hospital in 1931 he was appointed emeritus lecturer in ophthalmology in the medical school and consulting ophthalmic surgeon to the hospital. In the same year he was elected chairman of the council of the Royal Eye Hospital and became a member of the Court of the Society of Apothecaries of London. He was Junior Warden of the Society in 1937–8, Senior Warden in 1938–9 and Master in 1939–40, and was a representative of the Society on the Board of Registration of Medical Auxiliaries, of which he was a vice-president and former treasurer. He was a member and past chairman of the governing body of his old school at Wimbledon and a member of the committee of management of the Chelsea Physic Garden. In 1939 he was appointed a Fellow of King's College.

Mr. Cargill married Miss Emma Sherwood in 1897; she died in 1951, and he is survived by the three daughters of the marriage.

L. H. S. writes: Mr. Lionel Vernon Cargill will be remembered as a friend by a wide circle. His long life formed a linkage between the Victorian epoch and the present day. He had been house-surgeon to Lister and often held his juniors enthralled by reminiscences of the great man. He became interested in ophthalmology and served under Nettleship and McHardy. He was house-surgeon to the Royal Eye Hospital in 1893, and his case notes are still preserved in the bound in-patient records of the hospital: they are a pleasure to read because of their clarity and descriptive ability. He had a humorous eye for character, and in later years delighted in describing the famous personalities he had met at King's and the Royal Eye at the turn of the century.

From McHardy he acquired a love of the sea. For many years his spare time was largely spent aboard his yacht, to which he would repair at week-ends with his family. He knew and loved the Thames estuary, and it was only natural that he should be for many years ophthalmic surgeon to the Seamen's Hospital at Greenwich. He enjoyed travel, and one of his happiest periods was his service during the South African war.

After his return he rapidly achieved a respected position as an ophthalmic surgeon, his main centres of work being King's College Hospital and the Royal Eye Hospital. His interests were in the clinical side of his specialty, and he was at his best in difficult cases requiring mature judgment and experience. As an operator he was careful and precise, playing for safety rather than trusting to flashiness or mere dexterity. His failures were few and his successes many. In the first world war he was honorary consultant for diseases of the eye to military hospitals in London, where he exercised the same high and careful standards of work. After the war his private practice increased, and he retired from his active clinical duties at the Royal Eye Hospital. He never ceased, however, to take an interest in its work, returning in later years to become chairman. His tenure of this post saw much modernization of the building and increase in the activities of the hospital. In similar fashion he returned in late life to become an outstanding chairman of the board of governors of King's College School, at which he had been a pupil.

His earliest qualification had been that of L.S.A. He never forgot this, and in later life gave years of service to the Society of Apothecaries, of which he became Master. It will be seen that one of Cargill's chief characteristics was his loyalty to any institution which had the good fortune to be associated with him. Nothing could daunt or shock him, and his clear and practical mind made him an excellent man of business. He would not tolerate the shoddy or second-rate. He was a master of reasoned and logical argument; and on committees he would sum up in the style of a high court judge weighing the evidence. He hated waste, and could be a formidable critic of the pretentious or extravagant. But behind the authoritative exterior there lay a sensitive and kindly personality. Those who worked with him will always remember him with affection. In the words of Chaucer: "He loved chivalrye, Trouth and honour, fredom and curteisye."

G. R. TUDHOPE, M.D., Ph.D., D.P.H., F.R.S.Ed.

Dr. G. R. Tudhope died suddenly on December 13 in Dundee at the age of 62. He was senior lecturer in pathology at the University of St. Andrews and pathologist to the Dundee Royal Infirmary.

George Ranken Tudhope was born at Newport, Fife, on July 7, 1893, and educated at Dundee High School and at the University of St. Andrews, where he was president of the Students' Union from 1916–18. After graduating M.B., Ch.B. in 1918 he was resident medical officer at Dundee Royal Infirmary for a year, and was then appointed, in 1919, lecturer in pathology and assistant to the professor of pathology in the medical school of the University of St. Andrews. In 1922 he took the degree of Ph.D. and the Diploma in Public Health. He proceeded M.D. in 1937 and in 1947 was elected a Fellow of the Royal Society of Edinburgh.

For many years Dr. Tudhope was treasurer of the students' charities campaigns in Dundee, where he was also president of the Naturalists Society. From 1948–51 he was a member of the Full-time Non-professorial Medical Teachers and Research Workers Group Committee of the B.M.A., and in 1953–4 he was president of the Association of University Teachers.

Dr. Tudhope's first wife died in 1946, and he is survived by his second wife, formerly Miss Christian T. Bisset, who is a lecturer in the law school at Queen's College, and by a son of his first marriage, Dr. G. R. Tudhope, who is a lecturer on therapeutics at the University of Sheffield.

We are indebted to Professor A. C. LENDRUM for the following appreciation: For 35 years Dr. Tudhope had been lecturer in pathology at the Medical School, Dundee, and every St. Andrews graduate who sat at his feet carries pleasant memories of his teaching. Through his first chief, the late Professor Lewis Sutherland, he was linked to the original Virchow tradition, but later became a profound admirer of Sutherland's predecessor in the Dundee chair, Sir Robert Muir, by then in Glasgow. His own researches began with a study of the stroma of tumours, and this continued from his Ph.D. in 1922, with various publications on the subject and the M.D. with honours and a Rutherford Gold Medal in 1937. Most of his other publications were on morbid anatomy and were written jointly, because he was the unusual combination of a shrewd, clear mind with a generous friendliness. It was always worth while to have a draft scrutinized by G. R. T., and the corrections were as easy to take as commendation.

He had an abiding but wise affection for the students and gave them unlimited help. At one time himself president of the Students' Union, he was staff finance convener of the Union for twenty-seven years. This willingness to undertake thankless jobs which he felt were part of his academic duty is seen also in his thirty years' service as secretary of the Staff Club of the College, and his twenty-nine years on the council of the Forfarshire Medical Association. Loyalty was the keynote of the man.

In recent years he had been warden of Airlie Hall, an inter-faculty students' residence, and both the generations of students and those who have stayed there during conferences carry with them the happiest memory of the charm and courtesy of Dr. and Mrs. Tudhope. His good humour never failed, although so many demands were made on his good sense, and these were indeed many, for he had been president of the Association of University Teachers, and a member of Senate, of the University Court of St. Andrews, and yet found time to look after foreign students as representative of the Church of Scotland, which he served so steadily.

C. R. ST. JOHNSTON, M.D., F.R.C.P.

S. C. D. writes: The death of Dr. C. R. St. Johnston (whose obituary was printed in last week's *Journal*) came as a severe and entirely unexpected blow to his colleagues on the Walsall group of hospitals of the Birmingham region. Dr. St. Johnston was appointed consulting physician to the Manor Hospital, Walsall, then under the municipality, immediately after his return to civilian life at the end of the war. On the nationalization of the hospital service he became a member of the medical staff of the Walsall group and assumed duties in addition at the General (Sister Dora) Hospital. From the inception of the new regime Dr. St. Johnston took a lively interest in its administration; he played an active part in drawing up the constitution of the medical staff committees set up to advise the hospital management committee, and his suggestions anticipated by some years those since made by the Ministry of Health. By free vote of his colleagues he was elected to the first medical advisory committee, and thereafter served on it continuously; at his death he was acting as its chairman. Dr. St. Johnston was as assiduous in his administrative as in his clinical duties; it was largely owing to his influence that the Sister Dora and the Manor Hospitals came to work in ever-increasing harmony, and the medical staff of the hospital group to regard themselves in the light of a team, working in the interests of the group as a whole. To his very high attainments as a physician many others will bear witness; the purpose of the writer is to pay tribute to the tact, patience, and judgment which made his services invaluable in committee, both as a member and as chairman. He will be very deeply missed in the Walsall Hospital Group.

HAROLD BOULTON, C.B., C.B.E., M.B., D.P.H.

Major-General Harold Boulton, who had had a distinguished career in the Indian Medical Service, died in hospital on November 30 at Fleet, Hampshire, where he had been living in retirement. He was 83 years of age.

Harold Boulton was born at Horncastle, Lincolnshire, on September 7, 1872, the son of Dr. A. E. Boulton. From Epsom College he went on to Clare College, Cambridge, with a scholarship. He took a first in Part I of the Natural Sciences Tripos and entered St. Bartholomew's Hospital with an Epsom scholarship, qualifying M.R.C.S., L.R.C.P. in 1897. He joined the Indian Medical Service in the following year and saw active service in Somaliland in 1901 and was mentioned in dispatches. He obtained the degrees of M.B., B.Chir. in 1905 and the London D.P.H. six years later.

On the outbreak of the first world war in 1914 Boulton left India for France with the Meerut Division, of which he was D.A.D.M.S. in 1914–15. During this time he was twice mentioned in dispatches and granted the brevet rank of lieutenant-colonel. While serving in Mesopotamia in 1916 he was again mentioned in dispatches. From 1918 to 1920 he was in East Persia as A.D.M.S., Lines of Communication, and received two more mentions. In 1920, as a reward for his services in the Afghan campaign of the previous year he was appointed C.B.E. He returned to work in India, and was appointed C.B. in 1928, the year in which he assumed the duties of D.D.M.S. of the Northern Command. He held this appointment until 1932, when he retired from the Indian Medical Service. He was Honorary Surgeon to the King in 1931–2, and had held the appointment of Honorary Surgeon to the Viceroy. He married Miss Maude M. Garton in 1912, and she survives him, together with the two daughters of the marriage.

Medical Notes in Parliament

Heroin Licences Renewed

The House of Commons was informed on December 15 of the Government's decision to suspend for twelve months the ban on the manufacture of heroin (*Journal*, December 17, p. 1507). Major G. LLOYD-GEORGE, Home Secretary, in a statement to the House, said:

"In debate in the House of Lords on Tuesday (December 13) the question was raised whether the powers of the Secretary of State under the Dangerous Drugs Act, 1951, relating *inter alia* to the control of the manufacture of heroin, extend so far as to empower him, for any purpose other than preventing the improper use of the drug, to refuse to renew the existing licences to manufacture when they expire at the end of this year. The Government are examining this question, and, in order to give the time for the consideration of this aspect of the problem which is undoubtedly required, have decided to renew the licences when they fall due for a further period of 12 months. Communications have been sent accordingly to the two licensed manufacturers. I want to make it clear that the only doubt that has arisen is on the question of the legality of prohibiting the manufacture of this drug. There is no doubt about the power to prohibit its import or export, and no licences to import or export will be issued after December 31, 1955."

There were some complaints about Parliamentary mismanagement and discourtesy to the Commons arising from the two days' interval before the Home Secretary's statement.

Dr. EDITH SUMMERSKILL (Warrington, Lab.) asked, in view of the rapid change of policy, what was the nature of the advice given to the Government by the Law Officers. Major LLOYD-GEORGE said it was quite unprecedented to disclose such advice. He also said that the relationship between the statute and the regulations was not "as clear as all that." The Act had been on the statute book since 1920. It was consolidated in 1951. The first request from the W.H.O. was made to the Government in 1950. This was the first time that the doubt had been expressed. Lord Jowitt himself had said he approached the matter with some caution; he said there was a great deal of doubt about it, and also that this was a new point that wanted careful consideration. That was what the Government proposed to do.

Sir ROBERT BOOTHBY (East Aberdeenshire, Con.) asked for an assurance that before any final decision was taken the Home Secretary would have further consultation with the B.M.A. and the Medical Research Council, and that the House would be given an opportunity of debating the subject before the Government came to a decision. Major LLOYD-GEORGE replied that it was not going to be easy to find something better than a representative committee to give advice to Ministers. They could not consult the whole medical profession, and it was not a profession from which

one got complete unanimity. The point surely was that it was accepted on all sides that the proper bodies to confer on technical matters with Ministers were those representative of the profession or industry with which they had to deal. Otherwise consultation would be utterly impossible. This particular committee had given two Ministers of Health advice on the matter, and he still could not see what better representative committee one could get.

Dr. R. BENNETT (Gosport and Fareham, Con.) asked if, under his powers, the Home Secretary could restrict the amount produced in the coming year to that needed here by the profession, taking account of existing stocks, and Major LLOYD-GEORGE said, "Yes." He also said it was the Government's intention to proceed with the White Paper and that it would be published as soon as possible.

Exports of Heroin

Major LLOYD-GEORGE informed Mrs. LENA JEGER (Holborn and St. Pancras South, Lab.) on December 13 that exports of heroin licensed by him under the Dangerous Drugs Act, 1951, in the 12 months ended September 30 amounted to 75.129 oz. (2.13 kg.). The countries of destination and the amounts licensed to each were: Denmark 11.111 oz. (315 g.), Eire 4.232 oz. (120 g.), Kuwait 0.881 oz. (25 g.), Eritrea 4.832 oz. (137 g.), Seychelles 0.070 oz. (2 g.), British Guiana 0.811 oz. (23 g.), British Honduras 5,432 oz. (154 g.), Mauritius 1.728 oz. (49 g.), Uruguay 46.032 oz. (1,300 g.).

Health Centre Stocks

Mr. A. BLENKINSOP (Newcastle-upon-Tyne, East, Lab.) asked the Minister of Health on December 12 whether he would authorize the holding of small stocks of simple drugs and dressings by doctors in health centres. Miss PAT HORNSBY-SMITH, Parliamentary Secretary, stated that local health authorities should provide at health centres what a doctor might reasonably require by way of drugs and dressings. If doctors themselves wished to hold such stocks, the Minister's authorization was not needed.

Vacant Practices

Dr. DONALD JOHNSON (Carlisle, Con.) asked on December 12 what was the number of single doctor practices that fell vacant during 1954, and in how many of these was a successor established on the same basis. Miss HORNSBY-SMITH told him that 230 single practices fell vacant during 1954, and 134 of these were filled on the same basis. She would send him information on the average delay between a vacancy occurring and the establishment of a successor.

Fenestration Operations

Mr. EDWARD EVANS (Lowestoft, Lab.) asked the Minister of Health what facilities were available in this country for fenestration operations in certain types of deafness; for how long these facilities had been provided; whether they were available in suitable cases under the Health Scheme; and what cost fell upon the patient.

Mr. IAIN MACLEOD stated on December 12 that this operation had been performed regularly for several years in many hospitals in this country, and could be obtained within the Health Service with no charge to the patient. Mr. EVANS said the answer would be welcomed by many people who only had the haziest idea of the facilities provided. Not long ago a great deal of publicity was given to the case of a girl who was sent to America and for whom £800 was collected. Would the Minister do what he could to see that the public were made aware of the facilities under the Health Service? Mr. MACLEOD said it made him very sad when he saw money being collected for people to have this sort of operation, either here or abroad. It was true that for some time there might have to be a waiting-list if there was particular pressure in a specialty, but it could not be made clear too often that every service was available free in this country under the Health Service.

Radioactivity Survey

Mr. ROY MASON (Barnsley, Lab.) asked the Minister of Housing and Local Government if he would conduct a survey to ascertain to what extent populations living in the vicinity of atomic energy plants were subject to increased radioactivity.

Mr. DUNCAN SANDYS replied on December 12 that the Atomic Energy Authority Act, 1954, required the Authority to ensure that ionizing radiations were not emitted from their premises or from any waste matter to an extent that would be harmful to persons or property. They were also required to keep the discharge of radioactive wastes within prescribed limits. The areas surrounding nuclear plants were regularly monitored; and he was satisfied that these requirements were being complied with.

Mr. HAMILTON asked the Minister of Works whether there had yet been any increase detected in radioactivity in the upper stratosphere consequent on the exploding of a hydrogen weapon recently by the U.S.S.R. Mr. N. BIRCH stated that some slight radioactivity from the recent Russian explosion had been detected in the stratosphere over the United Kingdom.

School Dentists.—The equivalent of 993 full-time dentists were working in the school dental service at the end of June, compared with 921 in December, 1947, and 717 in December, 1950.

Artificial Limbs.—On average about £5,000 a year has been spent on research on artificial limbs since the Ministry of Health took over responsibility for this service from the Ministry of Pensions and National Insurance.

Mental Illness.—The percentage of hospital beds occupied by patients suffering from mental illness is about 36. Including mental deficiency the figure would be about 42%.

War Pensioner Hospitals.—Seven war pensioner hospitals with a total capacity of 1,758 beds are under the direct administration of the Ministry of Health. In addition there are two Polish hospitals providing 498 beds.

Accidents at Home.—In Scotland 1,134 people died as a result of accidents in their homes in 1953, of whom 20.5% were children under 15. The total number in 1954 was 1,106, of whom 19.5% were children.

Medico-Legal

OWNERSHIP OF CASE PAPERS

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

On December 13, 1955, Marjorie Elizabeth Trevor, a student nurse, of Golders Green, appeared before Mr. Geoffrey Raphael in the Marylebone Magistrates' Court[1] on a charge of stealing documents from St. Mary's Hospital worth 2s. 6d., the property of the board of governors. The documents in question were the case papers relating to her own treatment. It was stated for the prosecution that Miss Trevor came for treatment at the hospital clinic and took the papers from a table in an office while the doctor was being called. This put the hospital authorities in an embarrassing position, because the papers covered a long and difficult case in the course of which threats of civil proceedings had been made on several occasions.

For the defence it was submitted that it could not be larceny for Miss Trevor to take the papers referring to her own case.

The magistrate observed that the overriding point was that in larceny a person must act dishonestly as a thief. No one was going to hold in that court that a patient had a right to his or her records. It was stated on Miss Trevor's behalf that she was not prepared to consent to any order for disposal of the documents, because rightly or wrongly she wanted them and thought that she needed them to get treatment.

The magistrate said that prima facie the documents were the property of the hospital, and until the matter was disposed of they should be handed back, leaving Miss Trevor to take such action to secure possession of them as she might be advised. The charge was then withdrawn and Miss Trevor was discharged.

[1] *The Times*, December 14, 1955.

Vital Statistics

More Dust and Less Smoke

Since 1939 the atmosphere over Great Britain has been increasingly polluted by grit and dust, but the pollution by smoke and oxides of sulphur has slightly decreased, according to a report just published by the Department of Scientific and Industrial Research (*The Investigation of Atmospheric Pollution*, H.M.S.O., 7s. 6d.). The data are limited to rather small areas by the few measuring instruments in operation during these years. The dust increased by about 30% at 58 sites during 1944–54, and decreased by an average of 18% at 29 sites. The average increase over the area covered by the gauges was thus 11%. The average smoke concentration at 11 urban sites was 27.4 mg. per 100 cubic m. in 1945–9, and 23.4 in 1950–4. The amount of sulphur dioxide in the atmosphere is usually proportionate to the amount of smoke, though near ground level it is absorbed preferentially by buildings, vegetation, and rain. During 1944–9 atmospheric sulphur dioxide increased in the London area and decreased in the north-western region. In 1950–4 it decreased over the whole area covered by the instruments.

Week ending December 10

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,226, whooping-cough 1,177, diphtheria 14, measles 2,819, acute pneumonia 517, acute poliomyelitis 130, dysentery 680, paratyphoid 10, and typhoid fever 1.

Infectious Diseases

The largest fluctuations in the notifications of infectious diseases in England and Wales during the week ending December 3 were increases of 239 in food-poisoning, from 212 to 451, and 236 for measles, from 2,521 to 2,757, and a decrease of 72 for whooping-cough, from 1,184 to 1,112.

The largest rises in the number of notifications of measles were 124 in Northamptonshire, from 111 to 235, 72 in Lancashire, from 231 to 303, and 60 in Devonshire, from 341 to 401; the largest falls were 92 in Glamorganshire, from 377 to 285, and 52 in Lincolnshire, from 78 to 26. The largest variations in the trends of whooping-cough were a fall of 66 in Yorkshire West Riding, from 187 to 121, and a rise of 37 in Devonshire, from 11 to 48. 1,127 cases of scarlet fever, 4 fewer than in the preceding week, were notified; the largest variation in the local trends was a fall of 25 in Lancashire, from 228 to 203. 25 cases of diphtheria were notified, being 15 more than in the preceding week and the largest total for the past 91 weeks. The rise was due to outbreaks in two areas, Staffordshire, Uttoxeter R.D. 13, and Essex, Epping and Ongar R.D. 7.

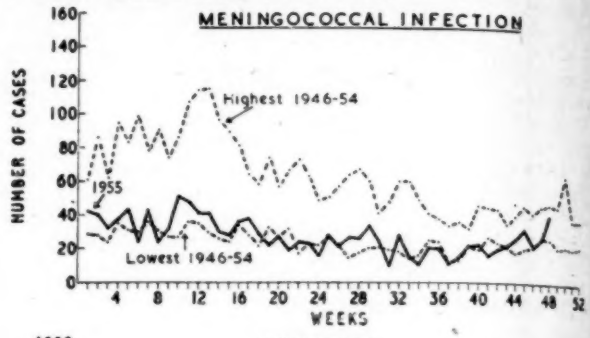
115 cases of acute poliomyelitis were notified. These cases were 18 fewer for paralytic and 26 fewer for non-paralytic cases than in the preceding week. The largest returns were London 22 (Woolwich 4, Greenwich 3, Lewisham 3), Surrey 19 (Banstead U.D. 5, Croydon C.B. 4, Malden and Coombe M.B. 3), Middlesex 11 (Heston and Isleworth M.B. 2), and Glamorganshire 6 (Swansea C.B. 2).

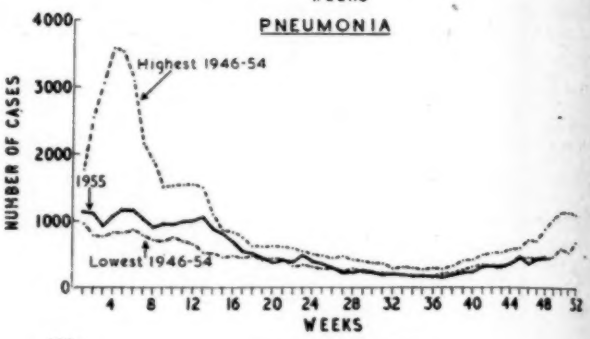
625 cases of dysentery, 14 fewer than in the preceding week, were notified. The chief features of the returns were an increase of 88 in Yorkshire West Riding and decreases of 49 in Lancashire and 26 in Surrey. The largest centres of infection during the week were Yorkshire West Riding 186 (Huddersfield C.B. 56, Thorne R.D. 50, Leeds C.B. 31, Kirkburton U.D. 10, Lancashire 109 (Liverpool C.B. 38, Stretford M.B. 11, Crosby M.B. 10, Lytham St. Annes M.B. 10), London 46 (Islington 10), Surrey 42 (Leatherhead U.D. 19), Carshalton U.D. 12), Middlesex 23 (Willesden M.B. 11), Leicestershire 23 (Leicester C.B. 16), and Warwickshire 22 (Birmingham C.B. 13).

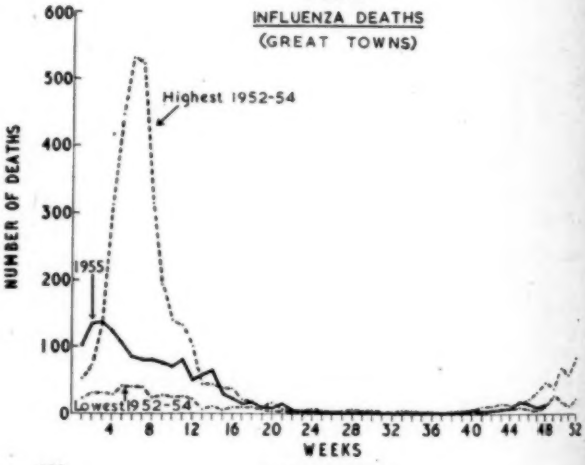
The largest outbreak of food-poisoning during the week was in Bolton C.B., where 261 cases were notified.

Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases (deaths for influenza) of certain diseases notified weekly in England and Wales (great towns for influenza). Highest and lowest figures reported in each week during the nine years 1946–54 (influenza, 1952–4) are shown thus ------, the figures for 1955 thus ———. Except for the curves showing notifications in 1955, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.







INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **December 3** (No. 49) and corresponding week 1954.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1955 Eng. & Wales	1955 Lond.	1955 Scot.	1955 N. Ire.	1955 Eire	1954 Eng. & Wales	1954 Lond.	1954 Scot.	1954 N. Ire	1954 Eire
Diphtheria	25	0	5	1	12	13	0	9	0	5
Dysentery	615	46	149	9	3	463	37	188	25	
Encephalitis, acute	6	0		0		0	0		0	
Enteric fever: Typhoid	6	2	1	1	1	0	0	0	0	1
Paratyphoid	6	0	7 (B)	0		2	0	5(A)	0	
Food-poisoning	451	19		2		183	24		0	
Infective enteritis or diarrhoea under 2 years				23	16				15	26
Measles*	2,757	22	64	17	46	6,017	390	548	318	73
Meningococcal infection	41	6	10	1		35	0	9	3	1
Ophthalmia neonatorum	24	0	6	0		33	1	3	0	
Pneumonia†	462	41	289	4	1	728	37	207	7	2
Poliomyelitis, acute: Paralytic	73	14	16	3	2	29	6	11	1	2
Non-paralytic	42	8				13	2			
Puerperal fever§	215	31	12	1		233	43	9	5	
Scarlet fever	1,127	83	140	55	45	893	69	186	51	41
Tuberculosis: Respiratory	627	76	112	22		677	75	128	27	
Non-respiratory	79	6	16	3		98	10	32	6	
Whooping-cough	1,112	80	92	99	118	2,156	127	180	37	51

DEATHS in Great Towns	1955 Eng. & Wales	1955 Lond.	1955 Scot.	1955 N. Ire.	1955 Eire	1954 Eng. & Wales	1954 Lond.	1954 Scot.	1954 N. Ire	1954 Eire
Diphtheria	1	1	0	0	2	0	0	0	0	0
Dysentery	0	0	1	0		0	0		1	
Encephalitis, acute		0			0		0			0
Enteric fever	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years	3	0	2	8	0	5	0	1	2	1
Influenza	13	1	2	0	2	47	4	2	1	1
Measles		0	0	0	0		0	0	0	0
Meningococcal infection		0	0				1	0		
Pneumonia	259	38	15	0	7	262	35	22	9	9
Poliomyelitis, acute	8	2			0	1	0			0
Scarlet fever		0	0	0	0		0	0	0	0
Tuberculosis: Respiratory	84	14	12	0	3	90	12	14	3	8
Non-respiratory		0	0	0	0		0	15	1	0
Whooping-cough	0	0	0	0	0	2	0	0	0	0
Deaths 0–1 year	209	25	32	10	5	223	24	24	11	23
Deaths (excluding stillbirths)	5,578	747	593	100	151	5,918	834	606	144	200
LIVE BIRTHS	6,916	1012	843	221	308	6,933	1055	821	201	330
STILLBIRTHS	172	19	20			207	26	29		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Medical News

R.C.S. at Manchester.—The first provincial meeting of the Royal College of Surgeons of England was held in Manchester on December 10, and culminated with the dinner at the University. Sir HARRY PLATT, P.R.C.S., presided. Following the Loyal Toast, Sir GORDON GORDON-TAYLOR proposed the health of the City and University of Manchester. He paid tribute to the City's achievements in war, commerce, and sport. In speaking of the university, he singled out the work of Elliot Smith and Wood Jones, who typified the tradition of anatomy there; in neuro-anatomy the achievements had been truly remarkable, and he mentioned the names of Telford, Sir John Stopford, and Sir Geoffrey Jefferson. Although this was the only occasion on which the Royal College of Surgeons had visited Manchester, twice had Manchester provided the College with a president in Lord Webb-Johnson and Sir Harry Platt. The LORD MAYOR of MANCHESTER thanked the Royal College of Surgeons for their visit, and Sir JOHN STOPFORD, F.R.S., the Vice-Chancellor, tendered his thanks to Sir Gordon Gordon-Taylor on behalf of the University. He regretted the absence of the Chancellor, Lord Woolton. Sir JAMES MOUNTFORD, Vice-Chancellor of the University of Liverpool, proposed the health of the Royal College of Surgeons. In his reply Sir HARRY PLATT drew attention to the responsibilities of the Royal College of Surgeons not only in Britain but in relation to the other colleges of surgeons all over the world. The demonstrations at the Infirmary and the cancer symposium at the university (see p. 1557) had been of a high order, and he thanked all those responsible for the success of the meeting. Sir GEOFFREY JEFFERSON, F.R.S., proposed the health of the guests. They included no less than four Vice-Chancellors, as well as the Lord Mayor and the Lord Bishop of Manchester. As Lord Webb-Johnson and Sir Harry Platt had travelled to London and become presidents of the Royal College of Surgeons, said the BISHOP of MANCHESTER in reply, so had Mahomet come to the mountain: now the College had come to Manchester, and he looked forward to the next occasion when the mountain would visit Mahomet.

Research on the Common Cold.—One hundred volunteers are urgently wanted at the joint M.R.C. and Ministry of Health Common Cold Research Unit, Harvard Hospital, Salisbury, for trials next January, February, and March. About another 500 will be required during the rest of 1956. Volunteers, of either sex, should be between 18 and 45 years of age and in good health. They stay at Harvard Hospital for 10 days, have a 50% chance of acquiring a cold, and are isolated in pairs. Fares to and from Salisbury are paid, up to a maximum of £3, together with pocket money of 3s. a day. Full information may be obtained by sending a postcard to the medical director of the Unit.

Interasma.—The International Association of Asthmology—to be known as "Interasma"—has announced its official foundation, following the intervention of asthmologists from 17 countries in Europe, South America, South Africa, and the Middle East. The chairman is Professor K. HANSEN (Lübeck), the treasurer Dr. C. HARF (Luxembourg), and the secretary Professor P. SANGIORGI (2, via Rivoli, Milan). The purpose of the association is to extend the theory and practical knowledge of asthma and related conditions. The association will be represented in each member country by a national delegate and will issue a review. The first scientific meeting will be held in 1956.

Breeding of Laboratory Animals.—The proceedings of a symposium on the breeding of laboratory animals, held last May at the Royal Society of Medicine, have now been published as volume 3 of the *Collected Papers* of the Laboratory Animals Bureau. The symposium was organized

by the bureau, and discussed such problems as breeding for routine biological assay, genetical aspects of breeding, the value of litter-mate controls in endocrinological research, and reproductive wastage. The volume contains 92 pages and is obtainable (price 7s. 6d.) from the Laboratory Animals Bureau, M.R.C. Laboratories, Holly Hill, Hampstead, London, N.W.3.

Sheffield University.—At the council meeting on December 16 Dr. SUZANNE CLARKE was appointed lecturer in bacteriology and virus diseases. She was formerly demonstrator in bacteriology at Bristol University.

Dr. R. B. Hervey Wyatt has retired under the age limit from his appointment as coroner for the southern district of London. He used to sit at the Battersea and Southwark courts.

Dr. Mark Baker.—The Carnegie Hero Trust Fund has inscribed the name of the late Dr. Mark Baker on its roll of heroes. Dr. Baker lost his life on August 17 while trying to rescue two men overcome by petrol fumes at the bottom of a well (*British Medical Journal*, August 27, p. 569).

Dr. Minna Gemmell, formerly in charge of the children's department at the Kuala Lumpur General Hospital, has been appointed senior medical officer to the W.H.O. maternal and child health nursing project at Patna, India.

London University.—Mr. R. SHACKMAN has been appointed to the university readership in surgery tenable at the Postgraduate Medical School of London. Mr. Shackman qualified from St. Bartholomew's Hospital, London, in 1933. He already holds an appointment as surgeon and urologist at the Postgraduate Medical School.

COMING EVENTS

International Congress on the Pathology of Infections.—The first congress will be held at the faculty of medicine and pharmacy, Lyons, from May 24 to 26, 1956. The principal subjects for discussion will be virus infections of the nervous system and collagen disorders in infections. Among the international bodies sponsoring the conference is the International Society for the Study of Infections and Parasitic Diseases. Further details from the secretariat, Institut Pasteur de Lyon, 77, rue Pasteur, Lyons. Titles of papers should be made known to the secretariat before January 15.

Middle East Medical Assembly.—The sixth assembly will be held at the American University of Beirut, Lebanon, from April 7 to 9, 1956.

International Union for Health Education.—The third conference will be held in Rome, from April 27 to May 5, 1956. Details from the medical director, Central Council for Health Education, Tavistock House, Tavistock Square, London, W.C.1

Medical Exhibition at Cardiff.—The organizers of the London Medical Exhibition will hold their annual regional exhibition at the City Hall, Cardiff, May 7 to 11, 1956.

APPOINTMENTS

BEWLEY, T. H., M.B., B.Ch., D.P.M., M.R.C.P.I., Temporary Senior Registrar in Psychiatry, St. Clement's Hospital, Bow, E.

BOYD, JOHN MACKIE, M.B., Ch.B., D.P.H., Senior Assistant Medical Officer of Health, County of Fife.

BROMAGE, P. R., M.B., B.S., F.F.A. R.C.S., D.A., Attending Anaesthetist, Royal Victoria Hospital, Montreal, Canada.

DRUMMOND, JAMES, M.B., Ch.B., D.P.H., Deputy Medical Officer of Health and Deputy Principal School Medical Officer, County Borough of East Ham.

EVANS, THOMAS STENNER, M.B., B.S., D.P.H., Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cardiff.

HORNE, WILLIAM A., M.D., D.P.H., Medical Officer of Health, Glasgow.

HOSPITAL FOR SICK CHILDREN, Great Ormond Street, London, W.C.—C. A. Holborow, M.B., B.Chir., D.L.O., Senior Registrar to Ear, Nose and Throat Department; Leonard Haas, M.D., M.R.C.P., D.C.H., Assistant Medical Registrar; Beatrice M. Evans, M.B., B.S., D.A., Resident Anaesthetist, Tadworth Court; K. S. Somers, M.B., B.Ch., M.R.C.P., House-physician; Mrs. Ellen L. Rhodes, M.B., Ch.B., D.C.H., House-surgeon to Orthopaedic and Plastic Departments; Susanna Isaacs, M.D., M.R.C.P., D.C.H., Part-time Registrar to Department of Psychological Medicine; D. A. McCredie, M.B., B.S., House-physician; John Sutcliffe, M.B., B.Chir., F.F.R., M.R.C.P., D.M.R.D., Part-time Deputy Director of Department of Diagnostic Radiology; Giuseppe Pampiglione, M.D., M.R.C.S., L.R.C.P., Dipl. in Med. Electroradiology. D. Neurol & Ps., Part-time Consultant Physician in charge of Electro-Encephalographic Department; Jean M. Shanks, B.M., B.Ch., Registrar to Department of Clinical Pathology; Herbert Barrie, M.D., and D. G. Cottom, B.M., B.Ch., M.R.C.P., Assistant Medical Registrars; D. E. Donovan, M.D., D.C.H., C.P.H., and W. P. Kennedy, M.D., D.C.H., House-physicians; Delia M. H. H. Cothay, M.B., B.S., and Hyman Perkin, M.B., Ch.B., House-surgeons; Deirdre M. Airey, M.B., Ch.B., D.C.H., Resident Medical Officer, Tadworth Court.

MANCHESTER REGIONAL HOSPITAL BOARD.—O. O. Cowpe, M.B., Ch.B., F.R.C.S., Consultant Orthopaedic Surgeon, Altrincham General Hospital and Withington and Wythenshawe Hospitals, Manchester; M. D. Cremin, M.B., B.S., F.R.C.S., D.L.O., Consultant Ear, Nose, and Throat Surgeon to Burnley and District Group of Hospitals; G. N. Mulliner, M.B., Ch.B., F.F.A. R.C.S., D.A., Consultant Anaesthetist, Preston and Chorley Group of Hospitals and Whittingham Hospital; D. T. Irwin, M.B., B.Ch., D.M.R.D., Consultant Radiologist to Preston and Chorley Group of Hospitals and Whittingham Hospital; J. Barr, M.B., Ch.B., D.M.R.D., Whole-time Consultant Radiologist to Macclesfield Hospital Centre and Parkside Hospital, with some duties in the Stockport Hospitals; J. A. Shrigley, M.B., Ch.B., D.Path., Whole-time Consultant Group Pathologist to Rochdale and District Hospital Centre; J. O'Regan, M.B., B.Ch., D.P.H., Whole-time Tuberculosis Physician, Rochdale and District Group of Hospitals; A. H. Kasasian, F.F.A. R.C.S., M.R.C.S., L.R.C.P., D.A., Consultant Anaesthetist to Wigan and Leigh Hospital Centre; N. F. Kirkman, M.D., F.R.C.S., Consultant Surgeon to Withington Hospital, Manchester; D. A. H. Walton, M.B., D.M.R.D., Whole-time Consultant Radiologist, Oldham and District Hospitals; A. K. Mitra, M.B., D.O., Assistant Ophthalmologist to Stockport and Buxton Hospital Centre; J. C. P. Weber, M.D., Whole-time Assistant Chest Physician, Barrow and Furness Hospital Centre; M. Levene, M.R.C.S., L.R.C.P., D.Path., Whole-time Assistant Pathologist to South Manchester Group Laboratory, mainly at the Christie Hospital and Holt Radium Institute; D. N. Ross, M.D., F.R.F.P.S., Whole-time Consultant Physician in Geriatrics to Ashton, Hyde, and Glossop Hospitals; R. M. Winston, M.D., Whole-time Assistant Pathologist (S.H.M.O.), West Manchester Hospital Centre; R. S. Nicholson, M.R.C.S., L.R.C.P., Whole-time Tuberculosis Physician (S.H.M.O.), Preston and Chorley Hospitals.

NUTTEN, H. E., M.B., Ch.B., D.P.H., Assistant Medical Officer of Health for Greenock.

PLEWS, W. R., L.R.C.P.&S.Ed., D.P.H., D.Obst.R.C.O.G., Deputy Medical Officer of Health, City of Stoke-on-Trent.

SOUTH-WESTERN REGIONAL HOSPITAL BOARD.—A. C. Akehurst, M.B., B.S., F.R.C.S., Senior Surgical Registrar to Exeter Clinical Area (joint appointment with the United Bristol Hospitals); H. I. Leigh, M.B., Ch.B., Surgical Registrar at Taunton and Somerset Hospital; C. P. Seager, M.B., B.Ch., D.P.M., Senior Psychiatric Registrar to Bristol Mental Hospitals; W. L. Elrick, M.B., B.S., Primary F.R.A.C.S., Surgical Registrar at Cheltenham General, Eye and Children's Hospital; A. J. Graham, M.B., Ch.B., D.P.M., Senior Psychiatric Registrar at Tone Vale Hospital, near Taunton; G. G. Habib, M.B., Ch.B., Medical Registrar to Bath Group of Hospitals; R. Merryweather, M.B., B.S., F.R.C.S., Consultant Orthopaedic Surgeon in North Gloucestershire Clinical Area; J. L. G. Thomson, M.D., M.R.C.P., D.M.R.D., Consultant Radiologist in Bristol Clinical Area; M. D. Youings, M.B., B.S., Senior Hospital Medical Officer in Infectious Diseases in Plymouth Clinical Area; B. M. Mandelbrote, M.B., Ch.B., M.R.C.P., D.P.M., Medical Superintendent to Horton Road and Coney Hill Hospitals, Gloucester; H. S. Singha, M.B., B.Chir., F.R.C.S., F.R.C.S.Ed., Surgical Registrar at South Devon and East Cornwall Hospital, Plymouth; R. M. Varma, M.B., B.S., Primary F.R.C.S. England and Edinburgh, Registrar in Department of Neurological Surgery, Frenchay Hospital, Bristol; D. G. Walker, M.B., B.S., Primary F.R.C.S., Registrar in General Surgery at the South Devon and East Cornwall Hospital, Plymouth.

THOMAS, HAROLD MERVYN, M.B., Ch.B., D.P.H., D.C.H., Deputy Medical Officer of Health and Deputy Principal School Medical Officer, Denbighshire.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Murray.—On October 14, 1955, at Boston Lying-in Hospital, Boston, U.S.A., to Betty Mary (formerly Turner), S.R.N., wife of David B. Murray, M.B., Ch.B., a daughter—Sylvia Ann.

DEATHS

Affleck.—On November 25, 1955, at Fleetwood, Lancs, James Affleck, M.B., C.M., of Kearsley, Lancs.

Aldren.—On November 25, 1955, at "High Seas," Salcombe, Devon, Bertram Cecil Robert Aldren, M.B., Ch.B., aged 81.

Browning.—On November 26, 1955, at 12, Barton Terrace, Dawlish, Devon, Herbert Acland Browning, L.S.A., Surgeon Commander, R.N., retired, aged 76.

Bruce.—On November 24, 1955, Robert Cathcart Bruce, M.D., formerly of London, aged 96.

Cargill.—On December 13, 1955, at his home, 63, Highlands Heath, Putney Heath, London, S.W., Lionel Vernon Cargill, F.R.C.S., aged 89.

Croft.—On November 5, 1955, at 19, Carlton Road, Ainsdale, Southport, Lancs, Herbert William Farnfield Croft, M.B., Ch.B., aged 43.

Davie.—On December 14, 1955, at a London hospital, Thomas Benjamin Davie, M.D., LL.D., F.R.C.P., of Capetown, South Africa, aged 60.

Finnegan.—On November 21, 1955, John Finnegan, *M.C.*, M.D., of Sanderstead, Surrey.

Hylton.—On November 24, 1955, at Malton, Canada, Rex Hylton, M.B., B.S., formerly of London, W.

Parr.—On November 19, 1955, at Harefield Hospital, Harefield, Middlesex, Percy Crowe Parr, M.B., B.Ch., of The Gables, Marlow, Bucks, aged 61.

Saunders.—On November 25, 1955, at R.A.F. Station, Old Sarum, near Salisbury, Wilts, Frederick Joshua Page Saunders, M.R.C.S., L.R.C.P., Hon. Squadron Leader, R.A.F.M.S., retired.

Scott.—On November 20, 1955, at the home of his nephew, Tighnaleigh, Alyth, Perthshire, Frank Donald Scott, M.B., Ch.B., late of 25, Buckingham Terrace, Glasgow.

Scott.—On November 15, 1955, at the Connaught Hospital, London, E., Harold Munro Scott, M.R.C.S., L.R.C.P., of Hoe Street, Walthamstow, London, E., and High Road, Buckhurst Hill, Essex.

Sutherland.—On November 17, 1955, at "Langwell," 42, Hillhouse Road, Edinburgh, Hector William Sutherland, D.S.O., M.B., Ch.B.

Thomas.—On November 17, 1955, Arthur Hitchings Thomas, M.B., B.S., D.P.H., late of Halling, Kent, and West Norwood, London, S.E.

Wright.—On November 12, 1955, at Manchester Royal Infirmary, Ernest Neville Wright, M.R.C.S., L.R.C.P., of 899, Rochdale Road, Manchester, aged 28.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

Cheese Dreams

Q.—*Why do some foods—for example, cheese—make some people dream?*

A.—It is assumed that indigestion is the cause of disordered sleep and disturbing dreams. So far as I know, there is no scientific evidence which implicates cheese or any other substance in food as a specific factor. The belief that dreams and indigestion are intimately associated has long been held. Thomas Phaire, writing in 1545 (*The Boke of Chyldren*, 1955, E. & S. Livingstone, Ltd.) "*Of terrible Dreames and Feare in the Slepe*," attributed them to "the arysing of stynkyng vapours out of ye stomake into the fantasye, and sences of the brayne, as ye maye perceyue by the breath of the chylde," and instructed mothers "to take hede that the chylde sleepe not with a full stomake, but to beare it about waking, tyl part be digested, and whan that it is layde, not to rocke it muche, for ouermuch shaking letteth digestion."

Vitamin Content of Grapes and Wine

Q.—*What is the vitamin content of grapes? Does it decrease after the grapes have been pressed and made into grape juice? What happens to the vitamin content when the juice ferments to form wine?*

A.—Rather more is known about the composition of fresh grapes and finished wine than about the changes which take place at successive stages in the winemaking process, but Lodi,[1] in a study of an Italian white wine, Castelli Romani, obtained some information which partially answers the inquirer's questions. Lodi reported that 1 kg. of grapes, containing 640 μg. carotene, 340 μg. vitamin B_1, 141 μg. riboflavine, and 134 μg. vitamin C, yielded 916 g. wine and 84 g. solid residue. The carotene disappeared rapidly during winemaking, the finished wine containing none and the solid residue about one-fifth of the original amount. The amount of vitamin B_1 decreased rapidly until only 2.2 and 8.8 μg. remained in the wine and residue fractions, respectively. Riboflavine increased to 170 μg., divided about equally between the wine and residue fractions. Vitamin C decreased to 3.3 and 2.9 μg. in the wine and residue fractions. No specific reference is made, however, at any rate in the abstract of this paper, to the relative effects of pressing and of fermentation.

Perlman and Morgan[2] studied the stability of natural and added B-vitamins during storage of grape juice and wine and concluded that vitamin B_6 and pantothenic acid are relatively stable, and also riboflavine if light is excluded, but that vitamin B_1 is largely destroyed, the extent of the loss being related to the amount of sulphur dioxide present. These workers also analysed five different commercial Californian wines and reported that they contained from 120 to 210 μg. riboflavine, and from 70 to 400 μg. pantothenic acid, per litre.

No fewer than eight kinds of commercial French wine produced in Burgundy and Bordeaux were analysed by Cailleau and Chevillard,[3] who concluded that red wines are appreciably richer in B vitamins than white wines. Their values for Graves (white) and *vin rouge ordinaire* (red) are as follows: vitamin B_1 8 and 86; riboflavine 130 and 220; nicotinic acid 0.75 and 1.30; and pantothenic acid 0.60 and 0.90 μg. per litre, respectively.

In their recently prepared *Food Composition Tables*, the Food and Agriculture Organization of the United Nations[4] give the average vitamin content of fresh grapes (presumably including red and white varieties) as follows: carotene 48, vitamin B_1 0.06, riboflavine 0.04, nicotinic acid 0.2, vitamin C 4 mg. per 100 g. It is stated that the amounts of these vitamins in most wines are negligible.

References

1. Lodi, M., *Vitamine u. Hormone*, 1943, **4**, 443 (see *Nutrition Abst. Rev.*, 1948, **18**, 58).
2. Perlman, L., and Morgan, A. F., *Food Res.*, 1945, **10**, 334.
3. Cailleau, R., and Chevillard, L., *Ann. agron. (Paris)*, 1949, **19**, 277.
4. Food and Agriculture Organization of the United Nations (1954). Food Composition Tables for International Use—Minerals and Vitamins. F.A.O. Nutritional Studies No. 11, Rome. Pp. 117.

Alcoholic Polyneuritis

Q.—*What treatment is advised for multiple peripheral neuritis in an alcoholic who has now completely given up alcohol? What is the prognosis?*

A.—The multiple peripheral neuritis which occurs in chronic alcoholics is not thought to be due to a direct toxic effect of alcohol; it is in all probability a deficiency disease resulting from inadequate thiamine intake in relation to the total carbohydrate intake, although the exact relationship between this deficiency and the changes in the peripheral nerves is somewhat speculative. On this basis it is usual to treat a patient suffering from alcoholic polyneuritis with a good mixed diet, large doses of thiamine by injection, and whole vitamin-B complex orally in the form of either yeast or concentrated vitamin-B tablets. The results of this treatment are in most cases far from dramatic; there is usually very slow improvement over the course of weeks or months, and, in the majority of patients, eventual recovery, provided contractures are prevented and the patient keeps to an adequate diet and abstains from alcohol. In the more acute stages of the illness rest in bed is essential; regular passive movements to the joints must be given, and light splintage if necessary, to prevent contractures. As recovery begins active movements within the limits of fatigue are valuable, and, if electrical reactions indicate denervation, galvanic stimulation of the denervated muscles.

"Liverishness"

Q.—*What is the physical basis of the transient malaise sometimes called "liverishness," characterized by somnolence, physical and mental torpor and yawning, and occasionally, perhaps, by tender, aching eyeballs? The attacks tend to coincide with the passage of stools with a more than usually offensive odour.*

A.—Since "liverishness" is mainly a subjective sensation, the term has varying connotations to different people, and no precise physical basis can adequately explain its protean manifestations. The reference of these symptoms to the liver may be a relic of the old view that this organ was the seat of the emotions. Disease was attributed to derangement of the humours, the liver elaborating yellow bile (choler) and black bile (melancholy).

The popular lay concept of liverishness is the "hangover feeling" after an alcoholic debauch. The symptoms and signs described by the questioner could fit this condition. The physical basis would then be a combination of gastro-enteritis and of dehydration due to the alcohol. The latter provides the basis for the popular practice of drinking a pint of water at the end of an alcoholic evening.

The evidence for hepatic involvement in liverishness is scanty, but the following points suggest it: (*a*) During convalescence from infective hepatitis, when the liver cells are presumably just recovering, alcohol may provoke liverishness more readily than in the person with a normal liver. (*b*) Liver function tests have been noted as abnormal immediately after an alcoholic bout. (*c*) Normally the small intestinal contents are sterile, but in the patient with cirrhosis there is a flourishing growth of Gram-negative bacilli. The absorption of these organisms or toxins derived from them through portal systemic collateral channels into the general circulation could cause the symptoms of a constitutional disorder.

However, these instances comprise but a few patients in whom hepatic dysfunction is known to exist and does not cover the liverishness of the otherwise healthy individual, which, so far, has no known organic basis.

Technique of Hypnotism

Q.—*How can I obtain a working knowledge of medical hypnotism? What books on the subject would you recommend?*

A.—Many medical men have become competent hypnotists after reading a detailed description of the technique, or after seeing a single demonstration, simply by choosing a volunteer and going ahead. Thereafter, experience with a number of subjects enables the beginner to recognize and to deal with the different forms of individual response. Confidence is soon gained, and it is in fact a little difficult, after initial success, to avoid a period of over-enthusiasm for the method. Induction by requesting the patient to fix his attention exclusively on a small bright object and suggesting increasing relaxation and sleepiness is the easiest method to learn and is the technique most patients expect. Among those who ask for treatment by hypnosis there are often patients whose motives are pathological, including those with hysterical character-change who may cause embarrassment to the practitioner or damage his reputation, and he should never hypnotize a female patient without someone present. Healthy, intelligent individuals make good subjects, and hypnosis is particularly successful as a safe analgesic in childbirth if it has been induced once or twice during pregnancy. There is an enormous literature, much of it repetitive, and the short bibliography compiled by the B.M.A. subcommittee on hypnotism this year (*Supplement*, April 23, p. 190) includes books on technique, historical background, scientific aspects, and relation to other methods of psychotherapy. The inquirer will do well to pay attention to the latter aspect, as hypnosis is one technique among several and is but rarely the method of choice. It is furthermore most unwise to attempt to treat functional disabilities and other psychological abnormalities without some knowledge of psychiatry. While hypnosis itself can do little harm, patients seeking to be treated in this way often include patients with early psychosis or organic nervous disease, who are in search not of psychological treatment but of magic or sensation, and whose subsequent decline may later be attributed by them to hypnosis.

Vaginal Examination and the Patient

Q.—*In teaching students the technique of vaginal examination, what points should be stressed so as to make the procedure as little disturbing to the patient as possible?*

A.—For the patient, the Sims position is usually preferable. Tension at the introitus is reduced by the slight lumbar flexion, and she may feel that modesty is better retained. For the examiner, the dorsal position is usually more efficient and muscular tension can be released if the knees are flexed and the sacrum is raised. A coverlet can reach below the knees.

Although some women are not sentient in the vagina, in others, if the technique is not careful, erotic feeling will be aroused, and this can cause great offence. The vagina normally has little sensation to an incoming object *provided it is moved slowly*. One finger can enter first, yielding to the contour of the vaginal wall, and the other finger can then enter slowly and almost without further contact with the mucosa. Provided the fingers are withdrawn slowly, too, no erotic sensation is likely to be induced. Care also should be taken not to press against the vulva with the thumb. Many students are unaware of these facts, and, having made their examination, withdraw their fingers too hastily. Not uncommonly at such a moment the patient inspires and flushes, and is clearly offended. Some practitioners appear to evade such difficulties by a firm and even rough examination, but this is equally undesirable. Often such methods will be met with a resisting spasm, which the patient is likely to adopt on subsequent examinations.

If water-soluble lubricants are used—and they help greatly to make the examination more comfortable—the vulva should always be dried afterwards. It is extremely unpleasant for a woman to have to walk home with a lubricated introitus. In some hospital departments a clean towel is provided for the patient to dry herself; otherwise the examiner should remove the lubricant with swabs. The examiner who takes trouble over these small details is often surprised by the patient's gratitude.

Incipient Gangrene of the Toes in the Elderly

Q.—*What treatment is advised for incipient arteriosclerotic gangrene of the toes in elderly patients?*

A.—This varies considerably with the local state of the circulation and the patient's general condition. No definite rules can be given which can be substituted for the opinion of a surgeon who is experienced in dealing with such cases. In a very general way it may be said that the possible treatment falls into the two classes of conservative and surgical. The patient should rest in bed in a warm room so that the part is protected and general vasodilatation of the skin maintained. Smoking should be prohibited, not because it is the cause of the disease, but because it causes vasoconstriction. Vasodilatation can be encouraged by alcoholic drinks, which also help to allay pain. Other analgesics should be given if necessary. Hot-water bottles must not be applied to the affected foot but may be used on the trunk to encourage reflex vasodilatation.

If the patient has rest pain in the foot unrelieved by these measures, or if the circulation in the affected toe fails to recover, it will be necessary to consider lumbar sympathectomy.

NOTES AND COMMENTS

Steam Disinfection of Bed-pans.—Professor L. P. GARROD (London, E.C.1) writes: May I briefly add a further observation to those in a letter from me which you kindly published on February 5, 1955 (p. 350), with reference to the steam disinfection of bed-pans? The efficiency of this process has, I understand, again been called in question because the main steam supply at St. Bartholomew's Hospital, where my tests were made, is at 60 lb. pressure (4.2 kg. per square cm.), and the results are thought to be inapplicable where the pressure is lower. Our Engineers' Department kindly fitted a variable reducing valve to the steam supply pipe to a bed-pan washer in a temporarily unoccupied ward, and I made tests with steam at 5 and 10 lb. pressure (0.35 and 0.7 kg. per square cm.) applied for periods of 15, 30, and 60 seconds following the automatic flushing for 30 seconds with hot water. Films of staphylococcal pus and of faeces were previously dried on both the bottom and the rim of the pan: after exposure these were swabbed off and cultivated. I failed to recover either staphylococci or *Bact. coli* in any test, even after steam at 5 lb. (0.35 kg. per square cm.) for only 15 seconds. This is scarcely surprising; flash pasteurization, which kills most vegetative bacteria in milk, employs a temperature of only 160° F. (71° C.) for 15 seconds. At 100° C. their death must be almost instantaneous. With the proviso that the steam jet must be of adequate size and give efficient distribution, and that these findings may not apply to bed-pans other than those made of metal, it may be concluded that steam at any pressure usually supplied in a hospital will serve for the efficient working of this apparatus.

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